

**UNIVERSITY OF KWAZULU-NATAL**

**The impact of the presence on global markets of Calcium Carbide originating from China on other industry role players: The case of SA Calcium Carbide (Pty) Ltd.**

**BY**

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## DECLARATION



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## **ABSTRACT**

This research assesses how the presence of calcium carbide originating from China in global markets has impacted on the operations of other role players in the industry. SA Calcium Carbide (Pty) Ltd. located in Newcastle, South Africa, was used as a case study. The study spanned all markets where the company has a footprint meaning domestically, regionally and internationally. Attention was also focussed on Chinese producers themselves with the intention of fully comprehending what makes them remain competitive despite offering goods or products at prices widely deemed to be below the dictates of the markets. It is widely perceived by South African calcium carbide producers and traders that the presence on global markets of the same product originating from China has had a profound negative impact on their competitiveness. The aim of the study therefore was to discern the extent to which companies like SA Calcium Carbide have been affected by the presence of products from China on the global market with special focus being put on the competitiveness in terms of pricing of products. The study used a survey strategy, and was exploratory in nature with the study setting being non-contrived. The choice of the survey strategy was motivated by the need to collect both quantitative and qualitative data in order to meet the research objectives. As encapsulated in the title of this research, the data was gathered, with an 80 percent response rate, using a questionnaire method from more than 70 current SA Calcium Carbide customers both from the domestic and the export side of the business. In order to consider the different perspectives of the whole scenario, 10 companies involved in either manufacturing or trading of Chinese manufactured calcium carbide were interviewed, some face to face and some telephonically. The study revealed that current customers, who are predominantly from the African continent, buy product from SA Calcium Carbide primarily because of its high quality, although they consider the price of the product as expensive compared to the Chinese product. It also emerged that the Chinese manufacturers and traders believe that capabilities such as new product innovation, joint ventures, favourable government policies and raw material sourcing strategies are very essential in building competitiveness of companies in the global market. Obviously evident from the results was that the export volumes of SA Calcium Carbide were on a gradual downward trend due to loss of market share to Chinese companies.

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# **CHAPTER 1**

## **Introduction and background to the study**

### **1.1 Introduction**

This research assesses how the presence of Chinese produced calcium carbide in global markets has affected the competitiveness of other producers and traders of calcium carbide. SA Calcium Carbide (Pty) Ltd, located in Newcastle, South Africa, was used as a case study. The study spanned all markets where the company has a footprint, meaning domestically, regionally and internationally. Attention was also drawn to Chinese producers with the intention of fully comprehending what makes them remain competitive, despite offering goods or products at prices widely deemed to be below the dictates of the markets.

In this chapter the background to the problem is given by analysing the current scenario characterising the calcium carbide business. The consequent problem is then stated followed by the major objectives that the study sought to meet. This chapter also includes a list of the key research questions that were answered by this study. The limitations of this study and their significance are also stated. A chapter by chapter outline of the study is then given before a conclusion reiterating the importance of the study sets the tone for the next chapter.

### **1.2 Overview of the problem**

According to Rossouw, Geerts and Xinwa (2014), the presence of Chinese firms in Africa has led to ambivalent views. While some views attempt to market China as a kind-hearted investor and very concerned about the welfare of Africa, others regard it as being a new colonial power whose major aim is to extract resources from the continent with little or no return for Africa.

The study further revealed that there has been marked penetration of residential areas and informal settlements by Chinese traders who are offering products at lower prices compared to those being offered by African counterparts, be it traders or producers. The influx of goods imported from China is not particular to Africa alone. Exports promotion, while having protectionist measures for the domestic market, has been described as being the cornerstone of China's transition to a market economy (Defever & Riaño, 2013).

There exists a school of thought that the cheap products from China contribute to the undermining of the development of Africa by prohibiting or thwarting the growth of the manufacturing sector, which under normal circumstances would have created jobs and wealth (Rossouw, et al., 2014). This argument is however countered by (Liang, 2013) who argues that of the main imports from China into Africa, about 51%, is machinery and equipment for the transportation sector. These are of absolute necessity in boosting the development of the industrial sector of Africa.

Consistent among themes pertaining to Chinese products is the perception that they are of inferior quality (Gadzala, et al., 2010). To counter this widely held perception, a lot of measures exemplified by quality examinations before shipping of industrial products that were meant for exports were introduced (Embassy of the Republic of China, 2014). These measures help to ensure that the quality of Chinese commodities exported is guaranteed.

### 1.3 An Overview of the calcium carbide sector of China

**Table 1.1 Chinese calcium carbide industry output and consumption levels**

Year	2000	2010	2011	2012	2013
Output (T)	3 400 000	16 500 000	18 500 000	20 000 000	23 000 000
Capacity (T)	4 800 000	22 500 000	24 000 000	32 300 000	38 000 000
Operation Rate	70.8%	65%	72.4%	61.9%	60.5%
Export Volume (T)	100 000	140 000	185 000	158 000	143 000
Apparent Consumption (T)	3 300 000	16 360 000	18 310 000	19 840 000	22 860 000

Adapted from China Chemical Reporter , 2014. *China Chemical Reporter*. [Online]

Available at:

<http://web.b.ebscohost.com.ezproxy.ukzn.ac.za:2048/ehost/pdfviewer/pdfviewer?vid=9&sid=128bbfdd-43b1-4aa5-877f-92ddc4c30222%40sessionmgr198&hid=115>

[Accessed 28 June 2015].

#### **Comment**

It is evident from the Table 1.1 above that although China consumes more than 90 percent of its own carbide, the export volumes are still very high. Any decline in consumption of calcium carbide within China, say because of the oversupply of polyvinyl chloride, where the carbide finds its most use, may increase the risk of dumping the product in the global market. According to Yu (2014), 'Capacity growth is unduly rapid and overcapacity is already serious.'

The question therefore relates to whether local manufacturers such as SA Calcium Carbide (Pty) Ltd could also become very competitive and sustain their edge in the global export market if they were to operate within the same markets the Chinese firms operate in? Is there hope then for South Africa's very own local producers to ward off competition from beyond the borders and thus lessen the overall impact of the presence of the Chinese manufactured goods on the local markets?

#### **1.4 Information on calcium carbide and SA Calcium Carbide (Pty) Ltd.**

Commercial calcium carbide, chemical formula  $\text{CaC}_2$ , has colour variations from steel grey to reddish brown depending on the impurities it contains and also depending on the method of manufacture (ASCC Pvt. Ltd, 2010). The article further explains that the chemical is produced from a reaction of lime and carbon in an electric arc furnace where temperatures of about  $2300^\circ\text{C}$  are required, and thus a large amount of electricity is consumed. Some of the many uses of calcium carbide as listed in the same report are:

- ❖ Manufacture of calcium cyanamide
- ❖ Acetylene for oxyacetylene welding
- ❖ Synthesis of organic solvents required in the pharmaceutical and dyestuff industries
- ❖ Production of organic solvents required in the manufacture of synthetic rubber and plastics (polyvinyl chloride or PVC)
- ❖ Production of desulphuriser blends and deoxidants for the steel industry (Andina Group, 2008).

SA Calcium Carbide (Pty) Ltd, abbreviated as SACC is situated on the outskirts of the town of Newcastle in the province of KwaZulu-Natal in the Republic of South Africa (Andina Group, 2008). It is the only calcium carbide producer in Africa and has been in the business since the 1970s (Kwakernaak, 2015).

## **1.5 Problem statement**

It is perceived by South African calcium carbide producers and traders that the presence on global markets of the same product originating from China has had a profound negative impact on their competitiveness (Kwakernaak, 2015).

## **1.6 Objectives of the study**

The idea of the study is to discern the extent to which companies like SA Calcium Carbide have been affected by the presence of products from China on the global market, with special focus being put on their competitiveness in terms of pricing of products. The following are the objectives of the study:

**Objective 1:** Find out what motivates current customers to buy from SA Calcium Carbide. The study covered current customers both from the domestic side and from the export side, regionally and internationally.

**Objective 2:** Establish the prices of calcium carbide as offered by the Chinese companies on the global market. Various sources for current prices are readily available including marketing information given to SA Calcium Carbide current customers. Africa customer visits to establish rapport and gather market intelligence are also planned for this purpose.

**Objective 3:** Establish how serious is the threat posed by the Chinese products to a company such as SA Calcium Carbide. This would be achieved through assessment of its current customers' opinions with regard to Chinese product quality, lead times to delivery, sales support and pricing of product.

**Objective 4:** Investigate what is sustaining the Chinese producers' value proposition at present. This was achieved through an analysis of their production processes and models, study of Chinese regulations, current average wages in China, safety records of Chinese companies, quality endorsements certificates for Chinese producers etc. For this the first prize was a visit to China. Telephonic interviews were also planned.

**Objective 5:** Draw up a list of recommendations on what strategies companies such as SA Calcium Carbide can employ to remain competitive and retain existing market share whilst still operating profitably and in a sustainable manner.

### **1.7 Key research questions**

The key research questions were therefore

- ❖ Why are current customers locally, regionally and internationally buying from SA Calcium Carbide (Pty) Ltd?
- ❖ What are the prices on the market for calcium carbide produced in China?
- ❖ How competitive are the Chinese producers in markets targeted by SA Calcium Carbide (Pty) Ltd?
- ❖ What is sustaining the Chinese producers' value proposition at present? Production processes efficiency? Favourable import-export regulations? Average employee wages? Relaxed SHERQ standards?
- ❖ What has been the impact of the Chinese products presence on markets to SA Calcium Carbide (Pty) Ltd prices?
- ❖ What strategies should companies such as SA Calcium Carbide (Pty) Ltd employ to remain competitive and retain or grow market share?



## **1.8 Significance of the study**

This study is of significance because it determined how the presence of goods from China on the open market, in this case calcium carbide, can trigger ripple effects on other similar role players as exemplified by SA Calcium Carbide (Pty) Ltd. located in South Africa. It also laid bare the red ocean strategies that can be adopted by such companies to remain competitive and thus relevant in the marketplace.

Another area of significance of this study was that it determined how governments of countries with Chinese products' influx can react to protect the local industries without reverting to extreme protectionist measures that can hurt international trade.

## **1.9 Limitations of the study**

The use of convenience sampling, a non-probability design, and the collection of data in a relatively short space of time with the least amount of difficulty was one of the limitations to this study. The data was collected from calcium carbide role players in the global market who are already existing SA Calcium Carbide (Pty) Ltd customers and who therefore were conveniently available to provide the research data. The downside of this method was that there are other users of calcium carbide in the global market that are not SACC customers who could have provided insightful feedback as they are also integral to the industry. It should however be noted that the findings of this study were fairly reflective of the population in the area of interest, as SACC commands a commendable global market footprint.

## **1.10 Outline of the study**

Chapter One introduces the problem justifying the need for the research, unveils the key research questions the study sought to answer, outlines the main research objectives and discusses the limitations pertinent to the study.

Chapter Two is based on a critical review of literature, which focussed on the secondary sources of data including books, periodicals, company journals, government publications, statistical abstracts, annual reports of companies, databases, conference papers, archival records etc.

Chapter Three gives a detailed description of the research methods that were used in the study and the justification behind their use. A description of the sampling design and the methods used for raw data collection and the subsequent analysis of same is presented.

Chapter Four presents in the form of graphs, pictures, tables, charts and narrative text the descriptive statistics arising from the data collected. Tabulation methods are used to present inferential statistics.

Chapter Five covers the discussions of the research findings. The interpretation and explanations of the findings is done in conjunction with the relevant literature review.

Chapter Six links the research objectives with the findings before conclusions are drawn. Recommendations arising from the study are also given to the stakeholders. The limitations that characterised the research are discussed and recommendations for further research outlined.

## **1.11 Summary**

In this chapter the perceived problem and the objectives the study sought to achieve were stated. The key research questions were also outlined. A brief overview and background of the focus of the study, which is the SA Calcium Carbide (Pty) Ltd case, was also given together with a description giving insight on what calcium carbide is, per se. The following chapter reviews the literature pertaining to the study.

## **CHAPTER 2**

### **Critical Review of Literature**

#### **2.1 Introduction**

In this chapter a critical literature review is carried out on how the presence of Chinese manufactured products in the global markets impacts other industry role players such as producers of calcium carbide. It should be noted that in undertaking the systematic review, due care is taken to minimise bias and also to make sure that there is no digression from the research questions. The literature review itself is broad covering a number of secondary sources. The review would be broad in the first part covering the dynamics of the presence of China in the world markets. The last part would then zero in on the calcium carbide industry itself and S.A Calcium Carbide as a case study.

#### **2.2 The emergence of China as a global trade player**

The years preceding 1978 saw China conducting minimal trade with the world at large, characterised by exportation of raw materials and other goods from manufacturing industries. This was just enough to cover the payments of importation of minerals and production materials deemed to be of a strategic nature (Xiaojun, 2012). Furthermore, Xiaojun (2012) attributes taxation reforms, banking practices, manipulation of exchange rates and effective management of foreign exchange in the 1990s as being responsible for the growth of China's trade volumes and gradual evolvement toward an export – led development strategy. Evidence suggests that China realised more profits from globalisation than any other country. From 1985 to 2000 the Asian country achieved an export growth on average of 4.5 percent per annum, a far cry from the second placed United States at 1.8 percent (Jilberto & Hogenboom, 2005). For the same period the real GDP's annual growth averaged 10 percent. The same authors draw a comparison between this GDP growth and that of developing countries over the same period that was 3 percent.

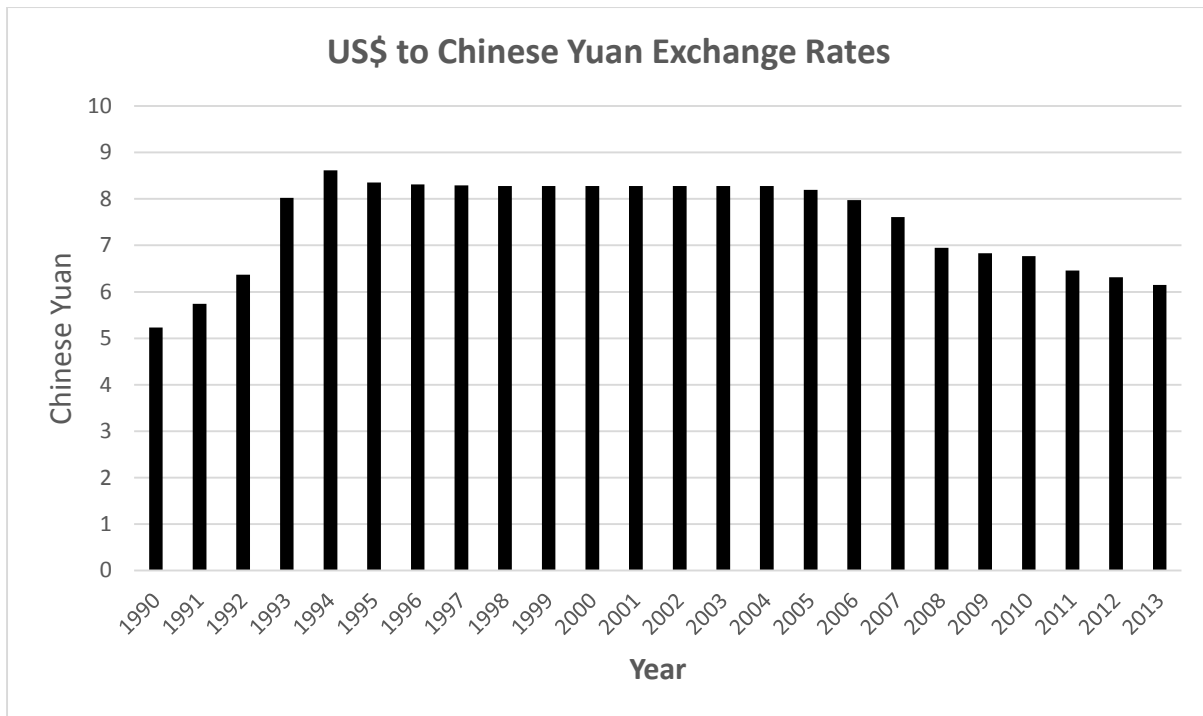
## **2.3 What makes China competitive in the global market?**

China's export competitiveness is a culmination of several factors (Adams & Gangnes, 2006) and thus is not mono-causal:

- ❖ An exchange rate that can be deemed favourable
- ❖ Abundance of unskilled labour and thus low wages
- ❖ The low costs of communication and transportation
- ❖ The expansiveness of the potential Chinese domestic market
- ❖ The encouragement of the Chinese policy for foreign trade.
- ❖ The opening of world markets
- ❖ The foreign direct investment inflow and the management of foreign currency and how it affects China's productive abilities.

### **2.3.1 How the exchange rate promotes competitiveness**

The exchange rate is a strategic variable that is critical in the determination of whether a country has the ability to create macroeconomic conditions that are ideal for internationally competitive industries (Wignaraja, 2005). Hence it is desirable to steer away from a rate of exchange characterised by an anti-export bias. Strategic plans on whether to import or to export are based on a real exchange rate, and the common view is that the Chinese realised an extra growth in their exports in 1994, when they devalued their currency from 5.8 to an all-time low of 8.73 RMB yuan per US dollar (Adams & Gangnes, 2006). Figure 2.1 below depicts the US\$ to Yuan exchange rate over the years.



**FIGURE 2.1 HISTORICAL US\$ TO YUAN EXCHANGE RATES**  
Adapted from Trading Economics, Exchange Rates, 2012 - 2015

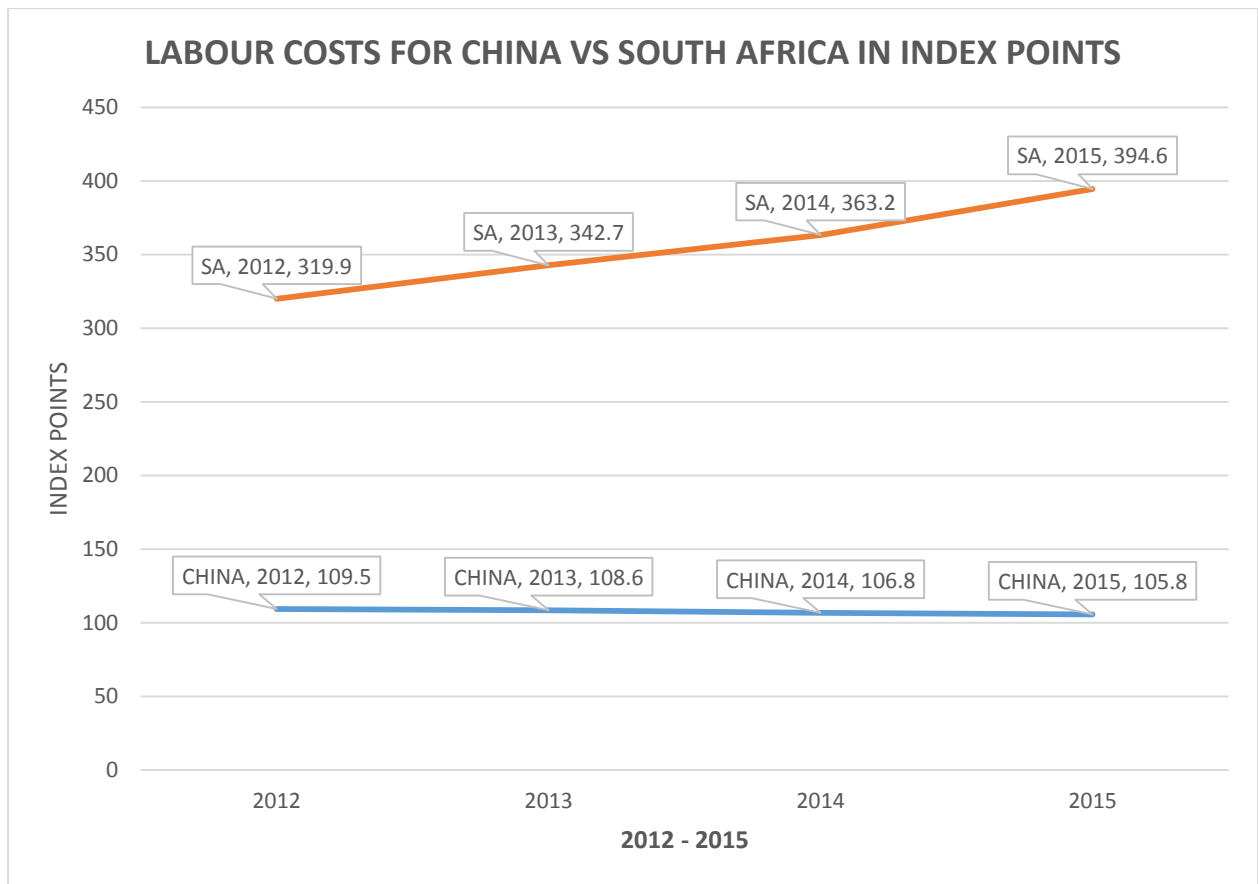
**REMARKS:**

It is evident from Figure 2.1 above that the Yuan was devalued in 1994 and stayed above 8 Yuan to the United States Dollar for almost a decade to capitalise on the competitiveness gained from the weak currency. The trend has gradually changed however in the last five years with the Yuan gaining against the United States Dollar.

### 2.3.2 How labour costs have enhanced competitiveness for China

According to Adams and Gangnes (2006), China has an enormous population of people in the rural areas and an ever increasing number of urban workers that are floating, suggesting that it will take a considerable number of years before there is a shortage of low cost unskilled labour. A country with an advantage of relatively low labour costs, as is mostly the case with China, enjoys the fact that its labour intensive goods in general, such as calcium carbide, would be very competitive in the world market thereby encouraging the export of such goods (Wang, 2004).

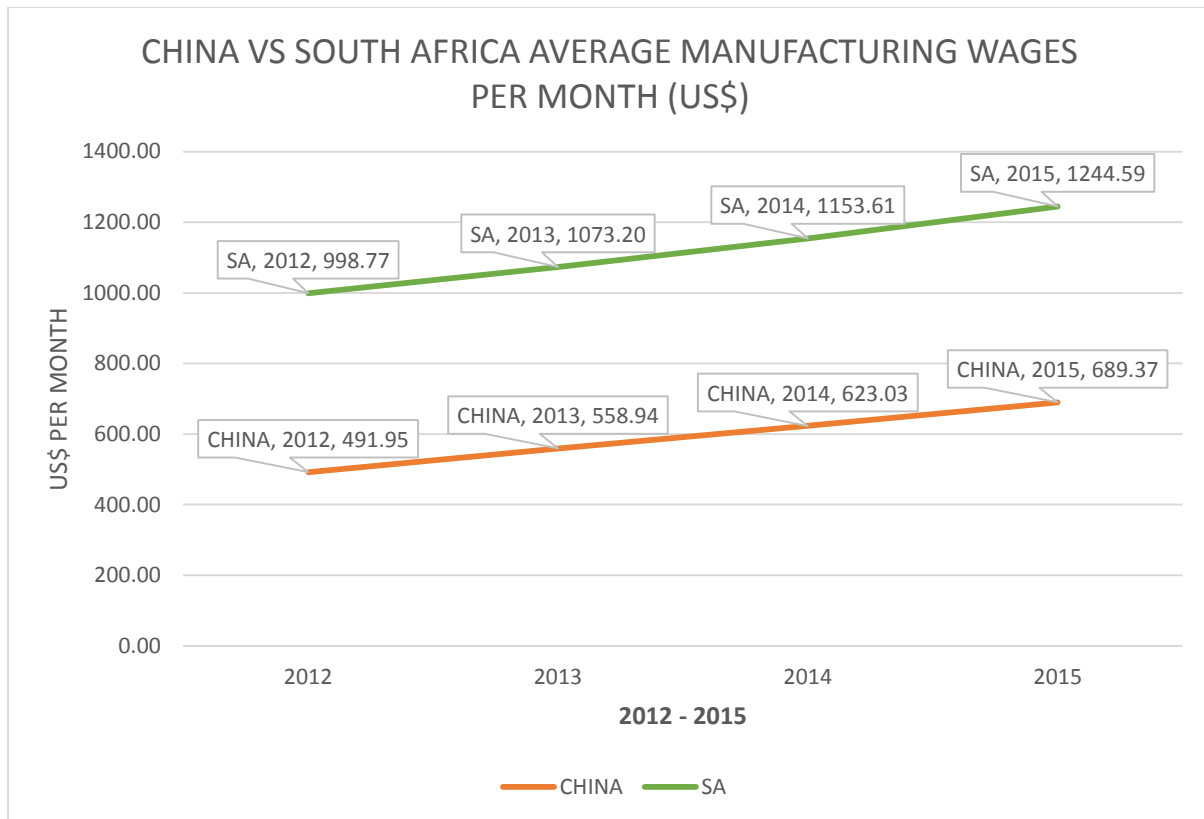
Figure 2.2 below shows the comparison in index points of the labour costs for China and South Africa.



**FIGURE 2.2 LABOUR COSTS FOR CHINA VS SOUTH AFRICA IN INDEX POINTS**  
Adapted from Trading Economics, Labour Costs (2012 – 2015)

### Remarks:

Labour costs in South Africa are projected to continue on an upward trend, reaching more than 400 index points by 2020. On the contrary, China labour costs are expected to continue on a downward trend as can be seen from the figures above. Comparisons between the manufacturing wages for both China and South Africa are drawn and are shown on Figure 2.3 below.



**FIGURE 2.3 CHINA VS SOUTH AFRICA AVERAGE MANUFACTURING WAGES PER MONTH**  
Adapted from Trading Economics, Manufacturing Costs (2012 – 2015)

**Remarks:**

The average manufacturing wages in South Africa are almost double those of China, again attesting to the fact that the cost of labour in South Africa is higher than that of China, as can be seen on the figure above.

### **2.3.3 Role of Foreign Direct Investment (FDI) in enhancing competitiveness**

FDI can be defined as a venture of an international nature, in which an investor with residence in the home economy has acquisition of influence in the long term management of an affiliate firm operating in the host economy (Contessi & Weinberger, 2009). According to the same definition, when the rights for voting under the multinational firm's control are at least 10 percent of the total voting shares of the foreign firm, then the existence of such an international venture can be assumed.

China's competitiveness in terms of production of goods for the world market has been catapulted by growth in FDI over the years (Adams & Gangnes, 2006). This is mainly because FDI allows not only inflows of capital but also importation of technology and managerial skills.

### **2.3.4 Export promoting policies as a determinant of competitiveness**

Export promotion is defined as an incentive programme designed to encourage companies to export goods by rendering help in the identification of markets, development of products, financing deals, offering schemes to guarantee payments and representation in foreign firms etc. (Esu & Awara, 2010). A paradigm shift from a culture of self-sufficiency to that of expansions in trade was pivotal in China's modernisation policy in the 1970s and the 1980s, as has been the advocating for FDI and private participation. The following are advantages and incentives for exporting firms in China ( (Adams & Gangnes, 2006):

- ❖ Foreign trade zones spread across the whole of China. All the inputs that are imported for use in manufacture of goods for exports, or sold inside the zones, are free of duty charged on imports and other indirect taxes (Panagariya, 2003).
- ❖ Being allowed to retain earned foreign currency.



- ❖ Special tax concessions. Tax holidays are available to enterprises that have foreign funding and are more generous in the Special Economic Zones compared to those that are available under the national tax legislation (Panagariya, 2003).
- ❖ Foreign firms are encouraged to partner with Chinese firms, thereby increasing FDI and development of export business. According to Panagariya (2003), the Bank of China grants loans in terms of foreign exchange, mostly to enterprises in which some of the investors are foreigners, for working capital and investments that are fixed.
- ❖ Duty exemptions are allowed on import goods intended to manufacture goods for the export market. In 1991, exports associated with import concessions accounted for more than 65% of China's manufactured total exports (Panagariya, 2003).
- ❖ Potential to trade in the world market is opened through export tariffs reductions and minimisation of quantitative restrictions. The enterprises that are oriented towards exports are recipients of indirect export subsidies in the form of inputs that are critical such as electricity from the provinces and cities.
- ❖ The Chinese economic system is highly decentralised, resulting in policy implementation largely under the control of the provinces (Panagariya, 2003).
- ❖ The regional governments also offer reduced land fees and assistance with employee recruitment to Foreign Invested Enterprises (FIEs) (Long, 2003).

It should be noted that through implementation of the aforementioned strategies, in a period of ten years, China's export volumes jumped from US\$120 billion in 1994 to US\$762 billion in 2005, becoming the second ranked world largest exporting country behind Germany (Yunhua, 2007). According to the 2013 Deloitte rankings, China was first in its Global Manufacturing Competitive Index and was projected to remain at the top for the next five years (Deloitte, 2013).

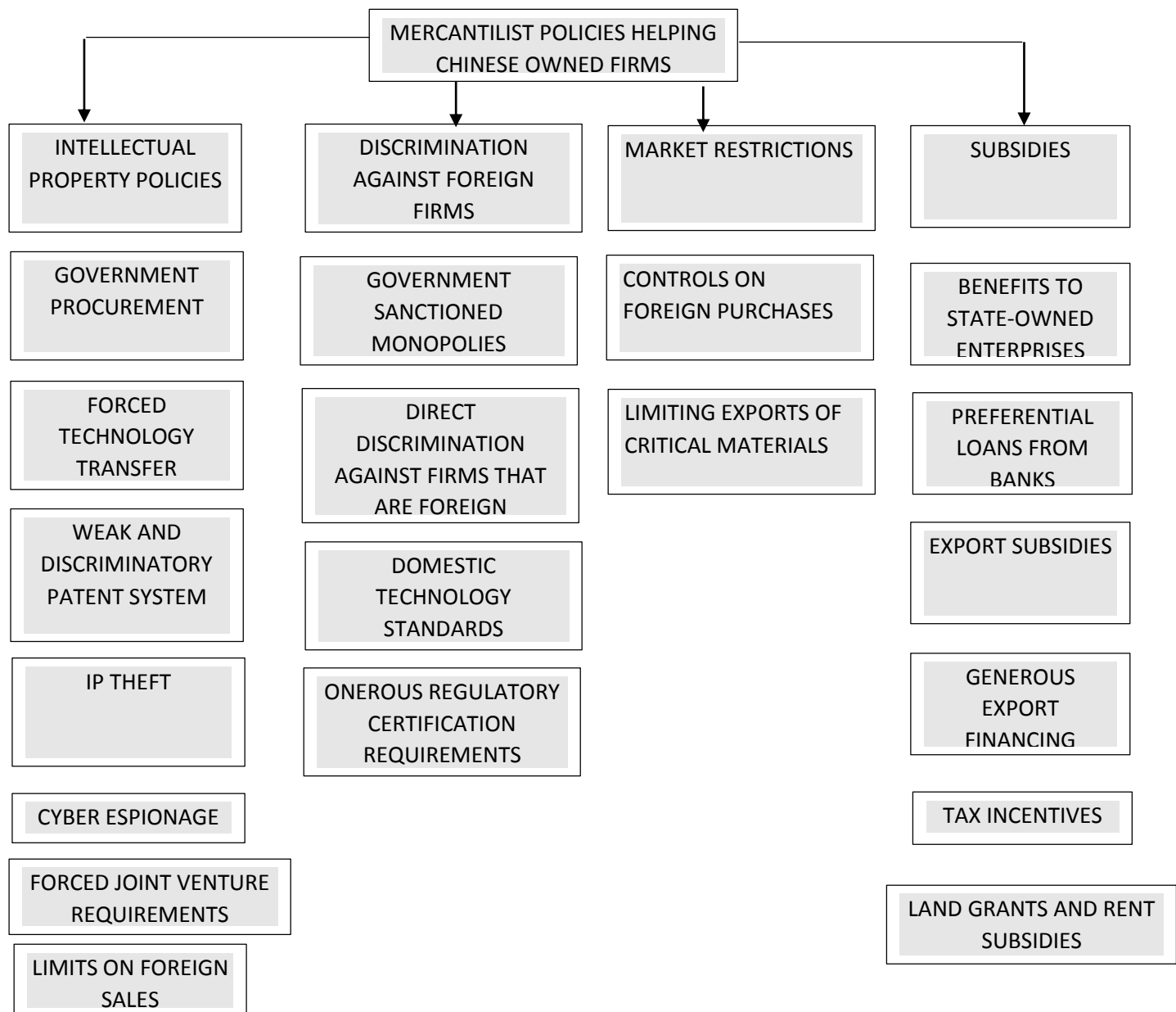
The report attributed China's competitiveness to a policy environment that is conducive by either supporting or financing directly, investments involving scientific or technological advancement, and education of employees and infrastructure development (Morrison, 2015). In recent times Chinese competitiveness is no longer confined to lower end production as was the case in the past, but policymakers are now focussed on growth of Chinese firms up the industrial value chain (Ahrens, 2013).

## **2.4 Environmental, social, safety and health conditions**

According to the European Commission for External Trade (2013), disregard of safety, social and environmental standards by China reduces its production costs and thus enhances its competitive advantage. This is because the regulatory regime for environmental protection is deemed not to be complete, and thus the implementation on the ground is inadequate and is thus biased towards local producers.

## 2.5 Summary of mercantilist policies enhancing Chinese firms' competitiveness

The Figure 2.4 below summarises the innovative mercantilist policies used by Chinese firms to gain competitive advantage.



**FIGURE 2.4 SUMMARY OF POLICIES THAT GIVE CHINESE FIRMS COMPETITIVE ADVANTAGE**

Adapted from Atkinson, R. D., ( 2012). *Enough is Enough: Confronting Chinese Innovation Mercantilism*. [Online]  
 Available at: <http://www2.itif.org/2012-enough-enough-chinese-mercantilism.pdf>  
 [Accessed 29 May 2015].

## **2.6 Chinese exports to Africa: Complementarity or competition?**

When considering the trade relations between China and Africa, it is apparent that the distribution of the trade flows from a spatial perspective is highly uneven, because although China sources its imports from nations that are resource rich, its exports penetrate most markets in the African continent (Haugen, 2011).

## **2.7 Perceptions of the quality of Chinese goods**

Chinese products are widely perceived to be of low quality (Gadzala, et al., 2010). According to Zhou, Su, and Bao (2002), cited in (Schniederjans, et al., 2004), China has concentrated in being competitive by offering low-priced goods at the expense of the product quality. The products, exemplified by calcium carbide, are therefore perceived to be of significantly lower value to the consumer than the products originating from other countries. Based on the assumption that unit value reflects quality, the predominant perception is that China exports lower quality varieties of the same products relative to its competitors in both the developed and the developing economies (Pula & Santabárbara, 2011).

Based on empirical investigation, the overall quality evaluation of China has just reached a standard that is general. Safety of products remains steady as a whole, government quality regulations are ineffective, and Chinese citizens' concept of quality is poor (Cheng, et al., 2014).

A contrary view also exists to the widely held views on Chinese products' quality. Some studies done to analyse cross-product heterogeneity of import penetration revealed that China's import penetration is higher in highly-differentiated products, which also have a higher fall in its relative price and a higher growth in quality (Álvarez & Claro, 2006). They concluded that the surge in productivity has precipitated the rise in both the quality and variety of Chinese products exported by China.

## **2.8 Implications of the presence of Chinese goods in Africa**

The growing Chinese presence in Sub Saharan Africa (SSA) poses particular threats to the manufacturing sector, thereby necessitating the need for the host countries to take active steps to counteract the imminent dangers to both existing and future capabilities in industry (Kaplinsky, et al., 2007). In their studies the same authors listed the following implications with regard to trade:

- ❖ China exports manufactured goods at a large scale compared to the rate it imports products from SSA, mainly oil and other hard commodities.
- ❖ The direct trade links between China and the SSA combine complimentary impacts, in the form of the enhancement of the welfare of the consumer by providing products that are not expensive with competitive impacts, where the products sourced from China are squeezing the domestic manufacturers in some countries.
- ❖ China's surge in terms of its competitiveness in world markets is having a negative impact on the competitiveness of poor Sub-Saharan countries that rely on exports. South Africa, Lesotho, Kenya etc. have been harmfully impacted resulting in substantial employment losses and subsequent surges in poverty levels.

The table below shows the impacts of the association between China and sub-Sahara Africa (SSA), both complimentary and competitive.

**TABLE 2.1 COMPETITIVE VS COMPLIMENTARY EFFECTS OF FFA AND CHINA ASSOCIATION**

		<b>Direct</b>	<b>Indirect</b>
<b>Trade</b>	Complementary	<ul style="list-style-type: none"> <li>❖ Source of industrial inputs</li> <li>❖ Affordable consumer goods</li> </ul>	The global prices for Sub-Saharan Africa exports rise
	Competitive	<ul style="list-style-type: none"> <li>❖ Less expensive products from China substituting locally produced goods</li> </ul>	<ul style="list-style-type: none"> <li>❖ Rivalry in external markets through prices going down and dwindling market shares</li> </ul>
<b>Production and Foreign Direct Investment</b>	Complementary	<ul style="list-style-type: none"> <li>❖ Influx of FDI into SSA</li> <li>❖ Capital goods that are cheap and appropriate</li> <li>❖ Transfer of technology</li> <li>❖ Global value chains integration</li> <li>❖ Infrastructure at low cost.</li> </ul>	
	Competitive	<ul style="list-style-type: none"> <li>❖ Replacement of local producers</li> <li>❖ Use of resources that are usually scarce</li> </ul>	<ul style="list-style-type: none"> <li>❖ Jostling for global FDI and platforms of production.</li> <li>❖ Withdrawal of investment and relocation by other non-local investors</li> </ul>
<b>Aid</b>	Complimentary	<ul style="list-style-type: none"> <li>❖ Financing in the form of grants and concessions</li> <li>❖ Provision of assistance in technical matters</li> </ul>	
	Competitive		<ul style="list-style-type: none"> <li>❖ Chinese aid to Latin America has an effect of creating productive capacity which in turn competes with SSA producers and results in lower export prices</li> </ul>

Adapted from Kaplinsky, R., McCormick, D. & Morris, M., 2007. *IDS WORKING PAPER 291: The Impact of China on Sub-Saharan Africa*. [Online]  
 Available at: <https://www.ids.ac.uk/files/Wp291.pdf>  
 [Accessed 4 June 2015].

**Remarks:**

As can be seen from the table, the association between China and the sub-Saharan Africa (SSA) has both competitive and complimentary effects. Furthermore, it should be noted that the growth of exports from China threatens SSA in two ways, namely competing with domestically oriented producers in the internal markets and also being rivals of the industries that are net exporters in the external markets (Kaplinsky, et al., 2007). When those sectors where China and Africa compete are taken into consideration, the increases in Chinese exports results in decreases in African production (Renard, 2011).

**2.9 Marked effect of the existence of Chinese exports in the global market**

China's growth in export supply capabilities has resulted in it capturing market share in the countries to which it exports, the consequence of which has been the reduction in demand for imports from other countries that also target the same markets (Hanson & Robertson, 2008).

The years 2000 to 2010 were characterised by a considerable shrinkage in Africa's export shares of manufacturing in Europe, the United States and Africa, with the reduction attributed mainly to the emergence of China (Giovannetti & Sanfilippo, 2009). The competitive impact however has been indirect in nature 'the most relevant being the reduction of market shares in developed countries and the decrease in global prices of manufactured goods' (Kaplinsky, et al., 2007).

According to (Atkinson, 2012), China's goals that can be said to be autarkic and mercantilist are contrary to an open type of international trading system governed by rules that China undertook to abide by when it joined the World Trade Organization (WTO) in 2001. He argues that when a country becomes a member of the WTO, it commits to a global trading system and not an exporting system. He further argues that for the Chinese mercantilist, the ultimate goal is not to compete in the making of a better product but to destroy the competition altogether.

China places its products in foreign countries at a lower price than the production cost, a practise known as dumping, and this has greatly damaged exports from other countries e.g. South Africa (Menéndez, 2007). He further stated that since 1995 China leads the list of countries with the most anti-dumping claims against it.

According to (Auer & Fischer, 2010), when labour intensive nations like China grow their exports into sectors that are predominantly labour driven also grow. This obviously has an effect of causing competition with the manufacturing sectors of such countries.

Former International Monetary Fund (IMF) chief economist Kenneth Rogoff chose to see the positive side of the growth of Chinese exports. In 2006 he stated that the remarkable growth and China's rapid integration globally generated favourable trade conditions that consequently resulted in lower levels of inflation in the global economy (Venables & Yueh, 2006).

## **2.10 Impact of the presence of Chinese imports on the South African manufacturing sector**

There is a school of thought that the fast rate of growth in Chinese imports over the last ten years is considered as an integral factor which contributed towards the realised slow output growth and the downward employment trend in South Africa's manufacturing sector (Edwards & Jenkins, 2015). The authors further wrote that the penetration by China into the South African market rose significantly during the same period, partly because of displacement of imports originating from other countries and fundamentally at the detriment of local production.

A review of the period 2000 to 2011 showed that 'producer prices of imported manufactured goods rose by 3 percent per year from 2000 to 2011, which was less than half the 6.3 percent annual increase in the producer price of South African produced manufactured goods' (Edwards & Jenkins, 2015). Evidence from the same period also points to the fact that Chinese imports played a role in lowering the producer price inflation in South Africa which in turn moderated increases in consumer prices thereby curtailing a rise in production costs.



### **2.10.1 Chinese competition and domestic production**

While acknowledging the existence of significant variation across industries, there is an aggregate trend that suggests that the industries in manufacturing that are subjected to greater competition from Chinese imports have registered small changes in sales volumes over the 2000 to 2010 period (Edwards & Jenkins, 2015).

### **2.10.2 The impact of Chinese competition on employment in South Africa**

The existence of Chinese competition can have effects on employment according to the following ways (Edwards & Jenkins, 2015):

- ❖ The derived labour demand elasticity can be raised by increases in import competition, hence lowering wages and levels of employment in those industries (Rodrik, 1997) cited by (Edwards & Jenkins, 2015).
- ❖ According to Bernard et al. (2007), also cited by Edwards & Jenkins (2015), the competition from China may also lead to output depression of existing domestic firms, and prompt the exit of firms that are less efficient, both of which will lead to a reduction in aggregate industry level employment.
- ❖ Domestic firms may cut down on employment and focus on upgrading and raising capital stock to remain competitive.
- ❖ On the contrary, employment gains may also accrue through the growth experienced by the export sector.

## **2.11 Chinese justification for methods employed for global market penetration**

According to (Atkinson, 2012), the Chinese leaders are conscious of the fact that their policies are being scrutinised especially in the United States, and they have justified the policies as follows:

- ❖ China may engage in practices that it deems are good for the country, just like the United States.
- ❖ China is doing exactly what the United States did when they were at the same stage of development.
- ❖ China maintains massive trade surpluses so that it can create jobs.
- ❖ China needs trade surpluses to maintain foreign currency reserves that are adequate.
- ❖ Intellectual property is a form of Western imperialism.
- ❖ China needs time as it is still learning the ropes of how to be a market-oriented economy.

## **2.12 Strategies that can be used by affected economies to withstand Chinese competition**

According to Giovannetti and Sanfilippo (2013), Italy has employed the following strategies to withstand competition from China:

- ❖ Instead of changing between sectors or moving up the technology ladder, it has stuck to its specialised traditional sectors but has upgraded the quality of its low tech products and labour intensive products when faced with Chinese competition.
- ❖ The prices for high technology products have been adjusted downwards especially in sectors where it does not hold comparative advantage.

- ❖ Differentiation has been fostered only for niche products within the sectors with high innovation.

President Obama, for example, 'has directed Ex-Im Bank to actively employ its full authority to provide matching financing support for U.S. firms seeking to secure domestic or third-country sales when they are up against non-competitive official financing that fails to observe international disciplines' (Atkinson, 2012).

According to Bernard and Koerte (2007), companies that solely rely on cost reduction strategies in response to competition from imports lose market share and competitive advantage, whereas those that resort to differentiation strategies are able to retain or increase their competitive strength.

There exists a school of thought that a developing country's own pattern of import protection, say for example its tariff structure, acts as a tax on its export sector and thus has a negative effect on the goal of increasing export earnings (Tokarick, 2006). This is because import tariffs create a disincentive to export by 'directly raising the domestic price of imports relative to exports, or equivalently, by reducing the price of exports relative to imports'.

Governments can apply many regulations on imports with respect to safety, labelling, health, marketing and technical standards (Ma & Lu, 2011). These are non-tariff barriers that would help erode some of the competitive advantages enjoyed by the importers and thus protect the domestic manufacturers. Governments can also introduce a host of 'anti-dumping regulations that usually involve a remedial or punitive anti-dumping duty' (Ma & Lu, 2011).

The effects of imports originating from China that are cheap can be cured through the implementation of the WTO's safeguard measures. This is a trade remedy encapsulated in the Article XIX of the General Agreement on Tariffs and Trade (GATT) of 1994 (Nhlabatsi, 2014). This remedy allows governments to impose temporary measures to protect domestic manufacturers that are deemed to have been seriously injured or are exhibiting threats of such an injury due to a surge of imports.

### **2.12.1 Implementation of import tariffs and import quotas to safeguard local manufacturers**

#### **Differences between import tariffs and import quotas**

A tariff is defined as a tax levied on imported goods and services (Rittenberg & Tregarthen, 2015). It therefore ultimately has an effect of raising the cost of selling imported goods. The same authors define a quota as a direct restriction of the total quantity of a good or a service that may be imported during a certain specified period. Quotas have an effect of restricting the total supply and thus subsequently increase the domestic price of the good or service on which they are imposed.

According to (Suranovic, 2006), quotas offer more protection to the domestic industry because they provide an upper bound in terms of fixed maximum quantity to the foreign competition the domestic industries will deal with. On the contrary, tariffs simply escalate the price, but do not necessarily limit the degree of competition or volumes of trade to any gazetted level.

### **2.12.2 Voluntary export restrictions**

These are a form of an export trade barrier, where the export firms agree to limit the quantity of goods exported to a foreign country (Rittenberg & Tregarthen, 2015). Although they are said to be voluntary, they normally arise when pressure is applied by the importing country to the exporter.

## **2.13 Focus on the calcium carbide industry**

Commercial calcium carbide, chemical formula  $\text{CaC}_2$ , has colour variations from steel grey to reddish brown depending on the impurities it contains and also depending on the method of manufacture (ASCC Pvt. Ltd, 2010). The article further explains that the chemical is produced from a reaction of lime and carbon in an electric arc furnace, where temperatures of about  $2300^\circ\text{C}$  are required, and thus a large amount of electricity is consumed.

Among many uses of the product, below are the main uses of calcium carbide (ASCC Pvt. Ltd, 2010):

- ❖ Manufacture of calcium cyanamide
- ❖ Acetylene for oxyacetylene welding
- ❖ Synthesis of organic solvents required in the pharmaceutical and dyestuff industries
- ❖ Production of organic solvents required in the manufacture of synthetic rubber and plastics
- ❖ Production of desulphuriser blends and deoxidants for the steel industry (Andina Group, 2008).

## **2.14 Case study: S.A. Calcium Carbide (Pty) Ltd**

### **2.14.1 Geographical location**

S.A. Calcium Carbide (Pty) Ltd, commonly referred to as SACC, is situated on the outskirts of Newcastle in the province of KwaZulu-Natal in the Republic of South Africa (Andina Group, 2008).

### 2.14.2 Products and Services

According to (Andina Group, 2008), SACC is the sole producer of calcium carbide in Africa. As already mentioned above, the calcium carbide in turn can be further processed to desulphuriser blends, deoxidants, acetylene carbon black and acetylene gas, all products of which the company supplies. SACC also offers technical support in the application of its products (Andina Group, 2008).

### 2.14.3 Target Customers

SACC is a global market supplier of calcium carbide with domestic, regional and international customers (Kwakernaak, 2015).

### 2.15 Perceived Threats

According to Kwakernaak (2015), S.A. Calcium Carbide (Pty) Ltd is fast losing market share both in the domestic and the export market. He attributes this to Chinese manufactured calcium carbide import penetration. This threatens the very existence and viability of the company to continue operating as a competitive entity.

### 2.16 Profiling the South African calcium carbide industry landscape

**TABLE 2.2 DOMINANT FEATURES EVALUATION OF THE CALCIUM CARBIDE INDUSTRY**

<b>Economic Feature</b> (Hough, et al., 2011)	<b>Analysis</b>
Market size and growth rate	The calcium carbide industry is big in South Africa with most companies generating acetylene gas and using it for the steel industry (Kwakernaak, 2015). In terms of lifecycle it is at the early maturing and slowing growth stage.
Number of rivals	SACC dominates the South African market as it is the sole producer of calcium carbide (Kwakernaak, 2015).

	However the world market is dominated by China, representing 96% of total supply and consumption (Chemical Economics Handbook, 2014).
Scope of competitive rivalry	Most companies compete at the global stage and having a presence in foreign country markets is integral to S.A Calcium Carbide long term competitiveness as it is a net exporter (Hough, et al., 2011).
Number of buyers	Market demand is fragmented among many buyers. These range from domestic steel producing companies like ArcelorMittal and acetylene producing entities like Afrox and Air Liquid. Regional markets are all over Africa with gas producing industries being the major players. International customers are located in the Oceania, Asia, Europe, Middle East and America. Companies like ArcelorMittal and Richards Bay Minerals have bargaining power because they purchase in large volumes (Kwakernaak, 2015).
Degree of product differentiation	Increasingly look-alike products of rivals from China are causing heightened price competition especially in West Africa.
Product Innovation	Although the industry is not characterised by rapid product innovation and short product life cycles it is under threat from substitutes from Ukraine.
Supply/Demand Conditions	The South African industry is not overcrowded with too many competitors. There is no surplus of capacity thus prices and profit margins are not being pushed down. The short supplies especially in terms of the 15-25mm product size fraction is creating a seller's market. However this might change if China continues to penetrate the industry (Kwakernaak, 2015).

Pace of technological change	Ongoing upgrades at SACC of the arc furnace and sludge treatment in the fluidised bed combustor are essential because of rapidly advancing production process technologies. The newly commissioned co-gen plant for electricity generation is also testimony to the need to always be innovative to remain competitive (Kwakernaak, 2015).
Vertical Integration	Instead of continually buying packaging drum SACC installed a drum manufacturing plant in 2006 to produce 55 and 120kg drums. It also replaced the traditional black drum with a blue one that is unique to South Africa. This has made SACC more competitive as inputs costs were reduced.
Economies of scale	The industry is characterised by economies of scale in its purchasing activities as it acquires lime and anthracite, the principal raw materials, in bulk. Export carbide is also shipped in containers to reduce freight costs.
Learning/Experience curve	SACC is characterised by learning how to best optimise furnace operations and other related activities from years and years of experience. For example most similar companies worldwide use expensive coke as a raw material but SACC has fine-tuned the use of the cheaper anthracite in carbide production. There is also a technical virtual library where all research work and learnings from experience are kept.

Adapted from Kwakernaak, P., 2015. *Commercial Manager S.A Calcium Carbide (Pty) Ltd* [Interview] (16 January 2015).

## 2.17 Environmental strategy analysis of South African calcium carbide

SACC is dedicated to the preservation of the environment and considers this as a key element in the optimal and sustainable running of the business (Andina Group, 2008). It has thus been certified as meeting ISO 14000 requirements.



The Fluidised Bed Combustor was actually built and commissioned to take care of wet sludge and thus adheres to environmental statutes. The Ballengeich site also boasts of a rehabilitated lime dumping site that won recognition from the government (Kwakernaak, 2015).

## 2.18 The Five – Forces model of competition dynamics (Hough, et al., 2011)

**TABLE 2.3 THE FIVE FORCES MODEL OF THE DYNAMICS OF COMPETITION**

<b><i>Factor</i></b>	<b><i>Evaluation</i></b>
“Competitive pressures associated with rival sellers” (Hough, et al., 2011)	<p>According to (Kwakernaak, 2015) rivalry is a weaker factor in South Africa because:</p> <ul style="list-style-type: none"> <li>❖ The Chinese products are deemed to be of poor quality and SACC customers’ loyalty is high.</li> <li>❖ Buyer costs to switch brands are very high as it would mean re-engineering of plants to suit a different product.</li> <li>❖ SACC meets world markets quality demand as it is ISO 9001 revision 2008 certified.</li> <li>❖ In South Africa the company is the sole producer of calcium carbide.</li> <li>❖ SACC has a stronger brand image and appeal</li> <li>❖ It also has stronger capabilities to provide buyers with custom made products owing to its different screening operations.</li> <li>❖ SACC also boasts of better dealer networks through the use of trading companies in various countries where otherwise direct entry would have been difficult.</li> </ul>
“Competitive pressures associated with the threats of new entrants” (Hough, et al., 2011)	<p>Kwakernaak (2015) regards entry threats as weaker in South Africa because:</p> <ul style="list-style-type: none"> <li>❖ The pool of entry candidates is virtually non-existent except China.</li> <li>❖ The entry barriers are high as SACC’s current customers have engineered their plants to suit the specifications unique to the company. Costs would also be too high as SACC uses anthracite which is locally procured and thus cheaper.</li> </ul>

	<ul style="list-style-type: none"> <li>❖ Industry markets will strongly contest the efforts of new entrants to gain a market foothold, as SACC has long-term contracts and is proudly South African.</li> <li>❖ SACC has partnerships with other big companies like ESKOM and IDC since it now generates electricity, and this would dissuade any potential new entrant.</li> <li>❖ The carbide production process is electricity intensive and as such no other entrants would be allowed as the national grid is already strained.</li> <li>❖ To set up a carbide production facility and a screening and drumming plant is very capital intensive and thus prohibitive.</li> <li>❖ It would be difficult for a new entrant to build a network of distributors and also to acquire warehouse space with companies like Rohek before shipping of products.</li> <li>❖ International trade restrictions are high as the South African government uses anti-dumping rules, local content requirements, quotas etc. to raise entry barriers for foreign companies thus protecting domestic producers from outside competition.</li> <li>❖ SACC has the ability and inclination to launch vigorous initiatives to block a newcomer's successful entry. This can be in the form of increased advertising, price cuts, product improvement and payment terms restructuring.</li> </ul>
<p>"Competitive pressures from sellers of substitute products" (Hough, et al., 2011).</p>	<p>According to (Kwakernaak, 2015), substitute products are weaker because:</p> <ul style="list-style-type: none"> <li>❖ Good substitutes for deoxidants and desulphurisers are scarce and are not readily available. For acetylene generation, calcium carbide is currently the only source and is not easily replaceable.</li> <li>❖ ArcelorMittal has chosen to use a deoxidant (Silicon Carbide) from Ukraine, but it is highly priced relative to the performance it delivers.</li> <li>❖ Although the handling of the hazardous calcium carbide poses a big challenge on the safety front, the end users are aware that they will incur high switching costs if they are to settle for a substitute.</li> <li>❖ The producers of substitutes are also not moving to add capacity.</li> <li>❖ SACC's products are renowned worldwide as being of superior quality, a barrier that any other substitute product would have to overcome.</li> </ul>

<p>“Competitive pressures stemming from supplier bargaining power and supplier-seller collaboration”</p> <p>(Hough, et al., 2011)</p>	<p>Furthermore, (Kwakernaak, 2015) thinks supplier bargaining power is strong because:</p> <ul style="list-style-type: none"> <li>❖ Needed inputs i.e. anthracite and lime are in short supply with only Idwala mine, ZACC, Maloma and Vaalkrans supplying the lime and the anthracite respectively. They have more leverage in setting prices.</li> <li>❖ The profitability of SACC hinges on the use of anthracite for the production process. ZACC anthracite enhances the quality of the calcium carbide produced and thus gives them bargaining power.</li> <li>❖ It would be costly both in terms of money and in terms of compromised quality to switch to different sources of the major inputs.</li> <li>❖ The lime and anthracite suppliers provide inputs that account for a sizeable fraction of the costs of the calcium carbide and associated end products.</li> </ul>
<p>“Competitive pressures stemming from buyer bargaining power and buyer-seller collaboration”</p> <p>(Hough, et al., 2011)</p>	<p>According to Kwakernaak (2015), most buyers bargaining power is weaker because:</p> <ul style="list-style-type: none"> <li>❖ They purchase the carbide and desulphurisers in small quantities and sometimes infrequently.</li> <li>❖ The buyer switching costs to other suppliers and competing brands are high.</li> <li>❖ SACC’s brand reputation is important to a buyer.</li> <li>❖ SACC’s products deliver quality or performance that is very important to acetylene producing and steel producing customers that is not matched by competing suppliers.</li> <li>❖ The collaboration between most customers and SACC provides attractive win-win opportunities.</li> <li>❖ There is a surge in buyer demand especially in the steel industry for deoxidants, thereby creating a seller’s market.</li> </ul>
<p>“Is the industry competitively attractive or unattractive”</p> <p>(Hough, et al., 2011)</p>	<p>The weaker collective impact of the five competitive forces point to a higher combined profitability of the calcium carbide industry participants within the South African domain. The situation is totally different in the export market.</p>

Adapted from: Hough, J., Thompson, A., Strickland, A. & Gamble, J. E., (2011). What Kind of Competitive Forces are Industry Members Facing?. In: L. Burger, ed. *Crafting and Executing Strategy: Creating Sustainable High Performance in South Africa: Text, Readings and Cases*. Berkshire: McGraw-Hill Education, pp. 61-85.

## **2.19 The S.W.O.T analysis for S.A Calcium Carbide**

### Strengths

- ❖ SACC has a strong influence in the metallurgical and gas industries by virtue of being a sole calcium carbide producer in South Africa.
- ❖ The brand awareness in the mind of the customers is good.
- ❖ The quality of the products is deemed to be high
- ❖ The price is also competitive in the world market due to the utilisation of low cost inputs such as anthracite.

### Weaknesses

- ❖ SACC makes use of middlemen in other countries, and it is not always possible to vouch for their ethics and marketing punch lines.
- ❖ The products are deemed to be extremely dangerous and hazardous to use.
- ❖ For the export market the company is totally reliant on shipping companies' efficiency and this sometimes results in long lead times.

### Opportunities

- ❖ SACC can still venture into new markets including those currently being served by Chinese companies owing to its low cost but high quality strategy.
- ❖ The steel industry is growing on the de-oxidants side, and this presents a big opportunity for SACC especially in North Africa and Turkey.

### Threats

- ❖ Entrants of substitute products especially on the desulphuriser side, where other companies are already using silicon carbide instead of calcium carbide for de-oxidation purposes.
- ❖ 'The advent of REACH, a regulation targeting improvement of the protection of personal health as well as the environment'. This requires early identification of the intrinsic properties of chemical substances in use and thus forces manufacturers or importers of chemicals to register with the European Agency of Substances and Prepared Chemists (ECHA).' (Andina Group, 2008).

## **2.20 Literature gap analysis and research objectives**

Whilst current literature abundantly dwells on what makes Chinese manufactured goods competitive in the global market and the overall impact such goods' presence have had on other role players in the industry, it is evident that:

- ❖ No particular study has been done focussing on the calcium carbide manufacturing sector in South Africa
- ❖ Although price comparisons between China and the rest of the world are available for calcium carbide, no proper explanations for the disparities are given.
- ❖ The extent to which Chinese calcium carbide products are influencing the buying patterns of consumers in other countries is still undetermined.
- ❖ The perceptions of the consumers in Africa and the rest of the world with regard to the calcium carbide sourced from China and that sourced from S.A Calcium Carbide need to be fully comprehended.
- ❖ Whilst much is known about the domestic market for calcium carbide, it is essential to gather regional and international market intelligence considering that S.A Calcium Carbide is a net exporter.
- ❖ Recommendations on how a small role player in the industry like SACC can withstand the competition posed by Chinese exports into the global market also needs to be arrived at and justified.

## **2.21 Summary**

The information gathered in the literature survey paints China as a global power whose emergence as a major force to reckon with was galvanised by its entry into the World Trade Organisation. It also revealed what China's value proposition is and how and why it has become so competitive in the world market. Other schools of thought are critical of the methods and policies China follows to gain competitive edge. The impacts on other role players that are also involved in exports has also been revealed, with several of those feeling the pressure the cheap products originating from the Asian country is exerting on the marketability of their own products. The information gathered also revealed what strategies countries can pursue in general to protect their own local manufacturers from the surge of the Chinese imports and thus preserve sustainability of operations and employment levels. The literature also focussed on the case study, S.A. Calcium Carbide (Pty) Ltd with a view to zero in on its operations and to understand how the presence of calcium carbide originating from China has impacted its domestic and global footprint. The chapter therefore provided the theoretical framework on which the research study is based. The next chapter describes the research methodology employed in carrying out the study.

## **CHAPTER 3**

### **Research Methodology**

#### **3.1 Introduction**

The aim of this chapter is the description of the research methodology employed in this study. The background to the study, its justification and the objectives sought to be achieved are restated. The research design, sampling technique, data collection and subsequent analysis are also explained with the basis being the literature pertaining to such methods.

#### **3.2 Background to the study**

This research assessed how the presence of calcium carbide originating from China in global markets has impacted on the operations of other role players in the industry. SA Calcium Carbide (Pty) Ltd. located in Newcastle, South Africa, was used as a case study. The study spanned all markets where the company has a footprint, meaning domestically, regionally and internationally. Attention was also drawn to Chinese producers themselves with the intention of fully comprehending what makes them remain competitive despite offering goods or products at prices widely deemed to be below the dictates of the markets.

Central to this study is the perception of South African calcium carbide producers and traders on how the presence on global markets of the same product originating from China has impacted on their competitiveness.

### **3.3 Key research questions to be answered**

The key research questions are thus

- ❖ Why are current customers locally, regionally and internationally buying from SA Calcium Carbide (Pty) Ltd?
- ❖ What are the prices on the market for calcium carbide as offered by Chinese producers?
- ❖ How competitive are the Chinese producers in markets targeted by SA Calcium Carbide (Pty) Ltd?
- ❖ What is sustaining the Chinese producers' value proposition at present? Production processes efficiency? Favourable import-export regulations? Average employee wages? Relaxed SHERQ standards?
- ❖ What has been the impact of the Chinese products' presence on markets to SA Calcium Carbide (Pty) Ltd prices?
- ❖ What strategies should companies such as SA Calcium Carbide (Pty) Ltd employ to remain competitive and retain or grow market share?

### **3.4 Aim and objectives of the study**

The idea of the study was to discern the extent to which companies like SA Calcium Carbide have been affected by the presence of products from China on the global market with special focus being put on the competitiveness in terms of pricing of products. The following were the objectives of the study:

- ❖ Find out what motivates current customers to buy from SA Calcium Carbide. The study covered current customers both from the domestic side and from the export side, regionally and internationally.
- ❖ Establish what the current prices of calcium carbide are as offered by the Chinese companies on the global market. Various sources for current prices are readily available including marketing information given to SA Calcium Carbide current customers. Africa customer visits to establish rapport and gather market intelligence are also planned for this purpose.



- ❖ Establish how big the threat is posed by the Chinese products to a company such as SA Calcium Carbide. This would be achieved through assessment of its current customers' opinions with regard to Chinese product quality, lead times to delivery, sales support and pricing of products.
- ❖ Investigate what is sustaining the Chinese producers' value proposition at present. This is going to be achieved through an analysis of their production processes and models, a study of Chinese regulations, current average wages in China, safety records of Chinese companies, quality endorsements certificates for Chinese producers etc. For this the first prize was a visit to China. Telephonic interviews were also planned.
- ❖ Draw up a list of recommendations on what strategies companies such as SA Calcium Carbide could employ to remain competitive and retain existing market share whilst still operating profitably and in a sustainable manner.

### **3.5 Research methodology followed**

Business research can be described as an inquiry or an investigation that is carried out in an objective and systematic manner into a specified problem with the aim of solving it (Sekaran & Bougie, 2014). It is of a critical nature and is both organised and data-based. According to Rajasekar, et al. (2013), research is an investigation aimed at solving problems that are both of a scientific and social nature through analysis that is both objective and systematic. On the other hand, research methods are the different kinds of procedures, algorithms and schemes that the researcher makes use of. They further define research methodology as systematic procedures by which researchers go about their work of describing, explaining and predicting phenomena.

### 3.6 Nature of the study

According to Van Wyk (2013), a research study can be categorised broadly as follows depending on the objectives sought:

- ❖ Descriptive research whose main aim is the representation of factors or variables that find relevance in a research question with accuracy and in a valid way.
- ❖ Explanatory study whose main aim is the pointing out of any causal links between the factors or variables that are particular to the research problem. It is sometimes referred to as analytical research.
- ❖ Exploratory study is driven by the need for identification of the environment wherein situations of interest, problems or opportunities reside in all likelihood. It further seeks to determine the salient factors or variables that might be found in that environment and are relevant to the research.
- ❖ Correlational research is carried out when the relationship between two or more situational variables is sought.

The calcium carbide study was exploratory. This was because a lot of work needed to be done beforehand to understand the global market for calcium carbide and to fully comprehend the impact of the presence of Chinese manufactured product on SA Calcium Carbide (Pty) Ltd. Although some facts were known from literature, more information needed to be gathered so as to be able to come up with a viable theoretical framework. The exploratory study relied on secondary research through a critical review of literature and both quantitative and qualitative approaches to gather data.

### **3.7 Involvement of the researcher with the study**

For credibility of research to be assured, it is of utmost importance for researchers to give clarity as to what role they played in the research especially if they employed qualitative approaches, as the research setting could make them assume various member roles during the course of the study (Unluer, 2012). These roles could range from being an insider within the group being studied to being an outsider totally disconnected from the interest group (Adler & Adler, 1994). The difference between insider and outside researchers is that the former opts to study a group they are part of, whilst the latter is not part the group that is being studied (Breen, 2007).

This study was carried out with minimal interference by the researcher, thereby allowing the events to flow normally except for the delineation of the relevant variables as stipulated by the critical questions. To ensure credibility of the study, the researcher encouraged the participants to be honest in their answers or expression of opinions and also reiterated that their anonymity was assured as per the dictates of the ethics requirements governing the research.

### **3.8 Study setting**

According to (Sekaran & Bougie, 2014), a research study setting can either be contrived or non-contrived. Contrived is when an artificial environment is created in which the events are under strict control. In this case the researcher seeks the establishment of a cause-effect relationship beyond any reasonable doubt. In contrast a non-contrived setting is the environment that is natural and allows normal occurrence of events typified by field studies where there is minimal interference by the researcher.

The study setting adopted in this research was non-contrived as there was minimal interference by the researcher and the events were left to proceed normally.

### 3.9 Research strategies

According to (Alford, 2006), quantitative and qualitative research strategies can be differentiated as follows:

**TABLE 3.1 DIFFERENCES BETWEEN QUALITATIVE AND QUANTITATIVE RESEARCH STUDIES**

<b>Quantitative</b>	<b>Qualitative</b>
The hypothesis formulated by the researcher in the first place is tested.	Capture and discover meaning once the researcher has collected the data.
The concepts are variables that are distinct.	Themes and generalisations, for example, characterise the concepts.
Prior to the collection of data, standardisation and systematic creation of measures is done.	No systematic creation of measures is done and the individual setting or researcher determines the measures.
Data takes the form of numbers from measurements that are precise.	Words and images from observations, documents and transcripts characterise the data.
Theory can be described as both causal and deductive.	Theory is largely inductive and can be causal or non-causal.
Standard procedures are used and there is assumption of replication.	Procedures used are of a particular nature and there is rarity of replication.
The analysis of the data is done using statistical methods, tables or charts and then what they depict is discussed and related to the hypotheses.	The analysis process involves the extraction of themes or generalisations from evidence followed by the organisation of the data to present a picture that is both coherent and consistent.

Adapted from Alford, R. R., 2006. Qualitative and Quantitative Research Designs. *The Craft of Inquiry*, pp. 3-4.

**Mixed methods** on the other hand involve integrating the collection and analysis of both quantitative and qualitative data in a single study or a program (Cresswell, 2003). The aim of this type of research is that both research methods, when used in unison, lead to a better comprehension of a research problem than if each of the methods is used individually (Bulsara, 2012).

#### Advantages of mixed methods (Bulsara, 2012)

- ❖ The different methods for collection of data ensure greater validity of the research.
- ❖ A number of perspectives are considered in answering the research question.
- ❖ Ascertains the absence of gaps to collected data.
- ❖ Ensures that there is less likelihood of the researcher having preconceived notions and assumptions.

A survey strategy was used in the study. The choice of this was motivated by the need to collect both quantitative and qualitative data for the key research questions listed above. A case study of SA Calcium Carbide (Pty) Ltd was used in order to fully grasp the impact of the presence of Chinese material on global markets. This was largely achieved through the examination of the real-life situation from various angles and perspectives as dictated by the research questions above and using multiple methods of data collection. The benefits of the mixed methods approach were thus harnessed.

### **3.10 Unit of analysis**

The unit of analysis bears reference to the extent to which the gathered data is aggregated during the stage of analysis of data (Sekaran & Bougie, 2014). These authors further explain the necessity of making a decision on the unit of analysis during the formulation of the research question. The methods used for the collection of data, the size of the sample, and even the variables covered by the framework may sometimes be dependent on the extent to which data are aggregated for analysis. The units of analysis can be individuals, dyads, groups, divisions, industry or countries.

As encapsulated in the title of this research, the data was gathered from more than 70 current SA Calcium Carbide customers both from the domestic and the export side of the business. Traders in Chinese products were also interviewed. It thus suffices to state that the **calcium carbide industry** as a whole was the unit of analysis.

### **3.11 Time horizon**

According to Saunders & Tosey (2013), a research onion has a final layer that has to be dealt with before reaching the core. This layer represents the time horizon over which the researcher would carry out the study. If research is done with an objective of answering a question or addressing a problem at a particular time, it is said to be cross-sectional and is usually in the form of a survey or a case study. However, should the study necessitate collection of data for an extended period of time, then the research is said to be longitudinal, and normally uses strategies such as an experiment, theory that is grounded, and archival research.

For the purposes of this study the data was gathered just once from SA Calcium Carbide customers and also from Chinese product traders over a period of weeks in order to find answers to the research questions. The **cross-sectional study** was very ideal to keep costs at minimum and to complete the research within the relatively limited time available.

### **3.12 The sampling process**

#### **3.12.1 Sampling definitions**

Sampling is the process by which a sufficient number of elements deemed to be relevant are selected from a population so that a comprehension of their properties or characteristics if studied would help better understand population elements (Sekaran & Bougie, 2014).

Sampling is simply stated as the selection of a proportion of the population in the area of the research which would be representative of the population (Landreneau, 2010). Furthermore, a sample is a subset of the population by which the researcher chooses participants for the study.

The sample method proceeds by the selection of a representative fraction of the population and using the data collected as information for the research (Latham, 2007). A sample is a “subgroup of a population” (Frey, et al., 2012). It has also been described as a representative “taste” of a group (Berinstein, 2003). The sample should be “representative in the sense that each sampled unit will represent the characteristics of a known number of units in the population” (Lohr, 1999).

The use of sampling of a population is standard across all disciplines and finds application whenever research is conducted. Only the creative description of sampling changes for purposes of creating understanding. The emphasis in the standard definition always is the selection of a portion of the population that truly represents it (Latham, 2007).

The following are the major steps to a sampling process (Sekaran and Bougie, 2014):

1. Definition of the population,
2. Determining the sample frame,
3. Determining the sampling design,
4. Determining the appropriate sample size
5. Execution of the sampling process.

### **3.12.2 Definition of population**

According to (Sekaran & Bougie, 2014), sampling starts with the definition of the target population in terms of elements, geographical boundaries and time in a precise manner. The target population is the group of elements to which the researcher wants to make inference and theoretically, the population is finite and can be counted (Fricker, Ron, 2014).

Population can also be referred to as a whole group of people, events or things of interest from which one wishes to investigate to make inferences from (Schindler & Cooper, 2006). An element is a single member of the population and is denoted by the letter N (Sekaran & Bougie, 2014).

In this study the target population was all the end-users and traders of calcium carbide from SA Calcium Carbide located locally, regionally and internationally. Chinese manufacturers and traders dealing in the same product were also targeted.

The total number of SA Calcium Carbide customers is about **one hundred and forty** and that of the Chinese manufacturers and traders about **twenty** (Kwakernaak, 2015). The population therefore consisted of **one hundred and sixty** elements.

### **3.12.3 Determination of the sample frame**

According to (Sandhana, 2015) a sampling frame can be defined as a list of all eligible members of a population that is targeted from which one can draw samples. This frame is necessary to arrive at an unbiased, accurate conclusion or finding, because it completely defines the population being studied. He further states that the fact that it is not normally possible or even practical to make direct observations of every element in the population of interest necessitates the need for a frame, as it restricts the population being studied to a figure that is manageable. The sampling frame can also be defined as a representation of the physical nature of all the elements in the population from which the sample is taken (Sekaran & Bougie, 2014). Although a sampling frame would be useful in the provision of a listing of each element in the population, it may not always be a current or up-to-date document. When there is a mismatch between the sampling frame and the target population then the result is the occurrence of a coverage error (Sekaran & Bougie, 2014).

For purposes of this study SA Calcium Carbide customers' and competitors' database served as the sampling frame.



#### 3.12.4 Determination of the sample design

Sampling design can be categorised into two major types which are probability and nonprobability sampling (Sekaran & Bougie, 2014). In probability sampling, the elements in the population have some known, nonzero chance or probability of being selected as sample subjects, whereas in nonprobability sampling the elements do not have a known or predetermined chance of being selected as subjects.

According to the University of the West of England (2007), **probability** methods require a list of the population being targeted to be comprehensive. The methods are largely dependent on selection at random, and in a variety of ways, from the population sample frame. They allow the use of statistical techniques which require random selection, and allow one to calculate the difference between their sample results and the population equivalent values.

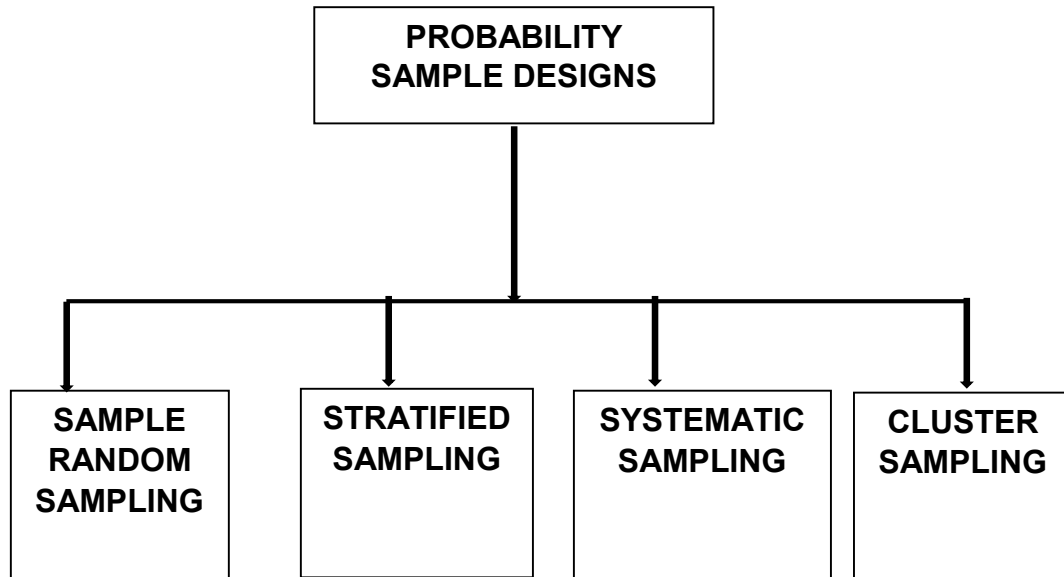
However **non-probability** samples are available, even when the sample frame does not exist, can be undertaken in a less complicated way, and may facilitate the minimisation of preparation costs of a survey. They can also be employed when there is uncertainty of the population of interest (University of the West of England, 2007).

The determination of the choice of sampling design should always be done bearing in mind the following points (Sekaran & Bougie, 2014):

- ❖ The relevant target population of focus to the study
- ❖ The exact parameters being investigated
- ❖ The kind of sampling frame available
- ❖ The costs associated with the sampling design
- ❖ The time available for data collection from the sample.

## Probability sampling

As illustrated in the Figure 3.1 below, there are various types of probability sampling:



**FIGURE 3.1 PROBABILITY SAMPLE DESIGNS**

Adapted from Kumar, R., 2011. *Research Methodology: A Step-by-Step Guide for Beginners*. [Online]

Available at: <http://www.sagepub.in/books/Book234218>

[Accessed 11 May 2015].

### Explanations:

- ❖ Unrestricted or simple random sampling – Every population element's chance of being chosen as a subject is known and equal. This sampling design has minimal bias and offers the most generalisability. It can also become tedious and costly (Sekaran & Bougie, 2014).
- ❖ Systematic sampling – It falls under restricted or complex probability sample designs. It involves drawing every  $n$ th element in the population, starting with a randomly chosen element between 1 and  $n$  (Sekaran & Bougie, 2014).

- ❖ Stratified random sampling – This is used in the estimation of population parameters when the subgroups of elements are identifiable within the population that may be expected to have different parameters on a variable of interest to the researcher. As is encapsulated in the name, it involves a process of stratification or segregation, followed by random selection of subjects from each stratum. It can further be divided into proportionate and disproportionate stratified sampling (Sekaran & Bougie, 2014).
  
- ❖ Cluster Sampling – In this sampling design the target population is first divided into clusters. These are samples gathered in groups or chunks of elements that, ideally, are natural aggregates of elements in the population. A random sample of clusters is then drawn, and for each selected cluster either all the elements or a sample are included in the sample (Sekaran & Bougie, 2014).

Nonprobability was chosen for this study over probability sampling due to limited time in which to conduct the study and the fact that a current listing of all SA Calcium Carbide customers and competitors dealing in Chinese products was not readily available at the time.

Sekaran and Bougie (2014) classified nonprobability sampling into two broad categories namely convenience sampling and purposive sampling. They further subdivided purposive sampling into judgement and quota sampling.

What follows are brief descriptions of the various types of nonprobability sampling designs (Sekaran & Bougie, 2014):

- ❖ Convenience sampling – It refers to the gathering of information from those members of a population whose availability to provide it is convenient to the researcher. It often finds use during the exploratory phase of a research project and is reportedly the ideal way of obtaining basic information quickly and efficiently. It is also convenient and less expensive, although it is not generalisable at all (Sekaran & Bougie, 2014).

- ❖ Purposive sampling – Here the sampling is restricted to particular types of respondents who are privy to the required information, either because they alone possess it, or they conform to some criteria stipulated by the researcher (Sekaran & Bougie, 2014).
- ❖ Judgement sampling – It entails choosing the subjects who are most advantageously placed or are strategically positioned for the provision of the information required. The sample members have to conform to certain criteria as set out by the researcher (Schindler & Cooper, 2006). Judgement sampling may curb the generalisability of the findings since only a sample of experts who are conveniently available are used by the researcher (Sekaran & Bougie, 2014). It should nevertheless be noted that sometimes it is the only meaningful way to carry out an investigation.
- ❖ Quota sampling – It is a form of purposive sampling that puts emphasis on adequate representation of certain groups in the study through the assignment of a quota. The quota fixed for each subgroup is dependent on the total numbers of each group in the population. The results however are not generalisable as this is a nonprobability sampling technique. It is very useful where minority participation in a study is of utmost importance (Sekaran & Bougie, 2014).

From the various types of nonprobability sampling techniques described above, a combination of convenience sampling and judgement sampling was the technique of choice employed in this study. Convenience sampling allowed the researcher to collect data from calcium carbide role players in the global market who are already SA Calcium Carbide (Pty) Ltd customers and therefore were conveniently available to provide research data. Judgement sampling on the other hand offered the researcher the freedom to select subjects who reasonably comprehended the calcium carbide business and industry so that they could provide informed opinions in their response to the research questions. It thus suffices to state that the use of the two methods in unison offered the researcher an opportunity to collect data in a quick, efficient and relatively inexpensive way.

### 3.12.5 Determination of the sample size

In a research study, ascertaining that there is an adequate sample for data collection is a precursor to analysis and reporting that is credible (Marshall, et al., 2013). It should be noted however that an increase in sampling size comes at an expense.

The determination of sample size should be dependent on the following factors (Sekaran & Bougie, 2014):

- ❖ The objective of the research
- ❖ The extent of precision required or the confidence interval
- ❖ The risk that can be accepted in the prediction of the required precision level
- ❖ The amount of population variability
- ❖ Costs and time constraints
- ❖ The population size itself.

Adjustments for ineligibles and nonresponse should also be considered. The best approach in the sample size determination for this study was based on the approach more suited for probability sampling. Krejcie and Morgan (1970, cited in Sekaran & Bougie, 2014) greatly simplified the determination of sample size by providing a table that ensures a good decision model. According to the table, for a target population size of **N = 160** elements, the sample size **n = 110** subjects.

### 3.13 Data collection

The methods used to gather data are an essential part of research design. The appropriateness of the methods employed enhances the value of any research. Data can be broadly classified into two types, primary and secondary (Kumar, 2011). Primary data is information the researcher obtains himself on the variables he is interested in for the specific study purpose, while secondary data refers to information already existing having been collected by someone else who is not the researcher conducting the current study (Sekaran & Bougie, 2014).

### 3.13.1 Primary data sources

- ❖ Surveys – These are sets of questions, fixed, whose administration can be done by paper and pencil, as a web form, or by an interviewer who is guided by a script that is strict (Harrell & Bradley, 2009).
- ❖ Interviews - These are discussions, usually between the researcher and an individual of interest, meant to collect information on a specific set of topics (Harrell & Bradley, 2009). Interviews can be conducted in person or telephonically. They differ from surveys by the level of structure associated with the interaction (Harrell & Bradley, 2009). Interviews have the advantage of flexibility in which the questions could be changed or adapted as the interview progresses. However they take time, are sometimes expensive, and there is a possibility of bias (Sekaran & Bougie, 2014).
- ❖ Focus groups – These are discussions amongst a group of people aptly described as dynamic used to collect information (Harrell & Bradley, 2009). Typically the group consists of eight to ten members with a moderator driving the discussions for about two hours on a topic, concept or product of interest (Sekaran & Bougie, 2014).
- ❖ Observation involves the collection of data by the researcher without having to participate in the interactions (Harrell & Bradley, 2009). They are usually employed when the researcher is more interested in the behaviour of individuals rather than their perception (Sekaran & Bougie, 2014). There is always a possibility of observe bias, and individuals may change their behaviour when being observed which has been described as the Hawthorne effect (Kumar, 2011).
- ❖ Questionnaire – The method is efficient when the researcher knows exactly what is required and how to measure the variables (Sekaran & Bougie, 2014). It is a written set of questions that prompts the respondents to record their answers, usually within rather closely defined alternatives (Sekaran & Bougie, 2014).

### **3.13.2 Secondary data sources**

Secondary data sources are those datasets that are already in place as sources of information exemplified by census data. Researchers may use one single source of data or may make use of combined data sourced from various feeds to create new datasets (Harrell & Bradley, 2009).

### **3.14 Data collection methods employed in this study**

For the purposes of this study both semi-structured interview and questionnaire methods were used. The interview questions were designed in such a way that they would be able to solicit information from Chinese calcium carbide suppliers and traders. The main objective of the interview questions was to find out what the Chinese suppliers' and traders' value proposition was. On the other hand the questionnaire was meant for the current SA Calcium Carbide (Pty) Ltd customers. This questionnaire was designed to gather information pertinent to how Chinese calcium carbide producers and suppliers have impacted the world industry as a whole through their pricing of the product, with special emphasis being put on current SA Calcium Carbide (Pty) Ltd customers.

#### **3.14.1 Interview questions design**

Interviewing has been described as a useful method of collecting data, especially during the exploratory stages of research (Sekaran & Bougie, 2014). They further stated that interviews can be conducted directly with the interviewer facing the interviewee, telephonically or online.

- ❖ **Unstructured interviews** are so called because the interviewer does not formulate a sequence of questions beforehand to ask the interviewee prior to entering the interview setting. One of the objectives of that type of interview is to unravel some issues first in order for the researcher to be able to identify the factors that are critical and deserve further in-depth investigation (Sekaran & Bougie, 2014). The researcher generates questions from the dialogues with interviewees thus exposing him to unanticipated views (Zhang & Wildemuth, 2010).
- ❖ **Structured interviews** are those carried out when the information sought after is known in the first place by the interviewer and there exists a list of pre-formulated questions to be asked of the participants (Sekaran & Bougie, 2014). The set of predefined questions would be asked in the same order for all respondents (Zhang & Wildemuth, 2010). This standardisation is meant to minimise the effects of the instrument and the interviewer on the results of the research.
- ❖ **Semi-structured interviews**, normally categorised under structured interviews, have more flexibility. A guide for the interview, usually with both closed-ended and open-ended questions, is made in preparation; but as the interview progresses, the interviewer can adjust the both the number and the order of the questions to be asked based on the participants' responses (Zhang & Wildemuth, 2010). In this study this data collection method was deemed to be the most suitable to gather information from the targeted respondents who were currently dealing in Chinese manufactured calcium carbide (**Appendix 3**).

### 3.14.2 Eliminating bias and establishment of credibility and rapport

According to (Sekaran & Bougie, 2014), bias refers to situations where the data collected is erratic or inaccurate. It could be introduced by the interviewer, the interviewee or the situation. In carrying out this study the researcher employed the following tactics to minimise bias (Sekaran & Bougie, 2014):

- ❖ Paying close attention to the interviewee
- ❖ Showing keen interest in what the respondent was saying
- ❖ Tact was exercised in the asking of the questions
- ❖ Repeating and/or clarification of the questions posed



- ❖ Some of the responses were paraphrased to ensure that they were not misunderstood.
- ❖ Recording of the responses as accurately as possible.

Establishment of rapport and credibility, and the motivation of the individuals to respond was achieved through projection of professionalism, enthusiasm and confidence (Sekaran & Bougie, 2014). The researcher explicitly stated the purpose of the interview and assured the respondents complete confidentiality (**Appendix 1**).

### **3.14.3 Interviews administration**

Both face to face and over the telephone methods were used to gather the data from the targeted respondents. The upside of face to face interviews, or direct interviews is that the research questions can be adapted when the necessity arises, doubts clarified and the researcher can repeat or rephrase the questions to ensure that the responses are fully understood (Sekaran & Bougie, 2014). The main disadvantages of direct interviews are the limitations related to geographical location they impose and the resources that are required if the study is to be done nationally and internationally. On the other hand with telephone interviews, a number of different people, no matter where located, can be reached in a relatively short space of time (Sekaran & Bougie, 2014). The main disadvantage of this method is that cues that are not verbal cannot be read and the interviews would have to be kept short. For the purposes of this study, face to face interviews with managers responsible for procurement were done with two companies in the United Arab Emirates, one in Oman and two companies in South Africa.

All the five companies are currently trading in Chinese manufactured calcium carbide and are big role players in the global market of the industry. Telephonic interviews were done to gather data from the other five companies that manufacture calcium carbide and are based in China.

### 3.14.4 Questionnaire design

A questionnaire is defined as questions in a set designed to collect information for latter analysis from a respondent on a topic of interest (McLean, 2006). Questionnaires are generally less expensive and do not consume a lot of time compared to interviews and observations, but their downside is that they are characterised by a much larger probability of nonresponse and response error (Sekaran & Bougie, 2014). 'Dubious and inconsistent questions produce ambiguous and inharmonious answers that result in futile analyses and incoherent outcome of the research' (Acharya, 2010). He further wrote that the results of research studies and recommendations thereof are all dependent on how perfectly the questionnaire is constructed.

'Questions can be personally administered to respondents, inserted in magazines, periodicals or other print media, mailed to respondents, or electronically distributed through email' (Sekaran & Bougie, 2014). Structured questionnaires are those in which the questions are specified and the responses are presented, or the own words of the participants' responses are kept to a minimum (Kothari, 2004).

When these characteristics are not existent, then the questionnaire can be described as unstructured. To develop a sound questionnaire, there are three focus areas namely the wording of the questions, planning on the categorisation of the variables, scaled and coded after receipt of responses and the general questionnaire appearance (Sekaran & Bougie, 2014).

A structured questionnaire (**Appendix 2**) designed for this study sought to answer key research questions related to the research objectives. A funnel approach recommended by Sekaran and Bougie (2014) was used in which general questions were first raised before gradual progression to the more specific questions.

Closed type questions were mainly used in which the respondents had to make a choice of the alternatives presented to them. An open ended question was however included at the end to allow the respondents to comment on any aspect they had chosen. The researcher developed the questionnaire.

### 3.14.5 Questionnaire administration

Consent was sought from the respondents before they could participate in the survey. The informed consent was the preamble of the questionnaire, and respondents could not continue with the survey until they had acknowledged that they fully understood what the research objectives were, and were comfortable to do so. The questionnaires were emailed to the intended respondents since they were already SA Calcium Carbide customers and were part of the database.

### 3.15 Scaling

Scaling involves the creation of a continuum on which objects are located (Sekaran & Bougie, 2014). They define a scale as a tool or mechanism by which individuals are distinguished as to how they differ from one another on the variables of interest to the study.

The following types of rating scales were used for this questionnaire:

- ❖ Category scales – This makes use of multiple items to elicit a unitary response and also uses a nominal scale (Sekaran & Bougie, 2014). Question 1 on general questions of the questionnaire in **Appendix 2** was an example of a category rating scale.
- ❖ Multiple choice – Single response scales – These scales are used to offer the respondents a single choice from a list of alternatives (Hou & Lissitz, 2012). Furthermore, they can be answered relatively quickly by respondents, a broader portion of the domain can be assessed more efficiently by administering more such items and they demonstrate greater content validity. Questions 3 and 4 sought to elicit a single response from a list of alternatives presented to the respondents.

- ❖ Multiple choice – Multiple response scales – These scales are used to offer the respondents various choices from a list of alternatives (Hou & Lissitz, 2012). Question 5 was an example of such a scale as the respondents can be both acetylene gas producers and also have a steel plant where they use calcium carbide as a raw material for desulphurisation and deoxidation functions.
- ❖ Likert scales – These are also known as summated rating scales and are used frequently. They consist of statements that can elicit either a favourable or unfavourable response of the respondent (Schindler & Cooper, 2006). The scale is designed to examine how strongly subjects agree or disagree with statements on a five point scale anchored by variations of the ‘agree’ and ‘disagree’ responses (Sekaran & Bougie, 2014).

The responses over a number of items tapping a particular concept or variable can be analysed item by item, but it is also possible to calculate a total or summated score for each respondent by summing across items (Sekaran & Bougie, 2014). Question 1 of the assessment questions makes use of the Likert-type scale.

- ❖ Numerical scale – It is similar to a semantic differential scale, where several bipolar attributes are identified at the extremes of the scale, and respondents are asked to indicate their attitudes, on what may be called a semantic space (Sekaran & Bougie, 2014). The difference is that on a numerical scale the numbers on a five-point scale are provided, with bipolar adjectives at both ends as can be seen on Question 2 of the assessment questions. This is also an interval scale.

### **3.16 Meeting research objectives from related questions**

Questions in the questionnaire and the interview were structured in such a way that they sought responses designed to answer some of the key research questions of the study and thus meet the research objectives as shown in the table below.

**TABLE 3.2 RESEARCH OBJECTIVES VS MEASURING INSTRUMENT RELATED QUESTION**

<b>Research Objective</b>	<b>Question Numbers</b>
Find out what motivates current customers to buy from SA Calcium Carbide. The study covered current customers both from the domestic side and from the export side, regionally and internationally.	Questionnaire Assessment Q1  (Appendix 2)
Establish how big the threat is posed by the Chinese products to a company such as SA Calcium Carbide. This was achieved through assessment of its current customers' opinions with regard to Chinese product quality, lead times to delivery, sales support and pricing of product	Questionnaire Assessment Q2  (Appendix 2)
Investigate what is sustaining the Chinese producers' value proposition at present. This was achieved through an analysis of their production processes and models, study of Chinese regulations, current average wages in China, safety records of Chinese companies, quality endorsements certificates for Chinese producers etc.	Interview Questions 4, 5 and 11.  (Appendix 3)

The objective for establishing current S.A Calcium Carbide prices was realised from gathering responses using a planned interview with the incumbent commercial manager, whilst the last objective for recommendations on marketing and pricing strategies would be met from the conclusions drawn from the research.

### **3.17 Pretesting of the interview and the questionnaire**

- ❖ Survey questionnaires, which are a type of measuring instrument, can and should be tested to ensure they elicit valid and reliable responses (Collins, 2003). Pretesting the questionnaire ensures that the questions are clear and can easily be understood, that they are correctly worded and there is no ambiguity (Sekaran & Bougie, 2014). Pretesting also has the advantage of finding new ways to capture the respondents' interest and potentially identify problems with the sequencing of the questions (Schindler & Cooper, 2006).

- ❖ It is vital to conduct a 'pilot' test of the interview questions to assess the feasibility of the individual techniques. A 'pilot' test will also give one an opportunity to perfect each question's concept and wording. The main objective is to reveal the thought processes involved in interpreting a question and arriving at an answer (Presser, et al., 2004).

Both the interview questions and the questionnaire were pre-tested among fellow work colleagues in the sales and marketing division at SA Calcium Carbide (Pty) Ltd. The pilot study group were first presented with the objectives of the interview and also the questionnaire. The pre-tests highlighted a few grammatical errors, some ambiguities and sequencing of question problems. These were then subsequently addressed following recommendations from the pilot group before subsequently using them in the research sample.

### **3.18 Validation and reliability of the interview schedule and the questionnaire**

The ability to analyse validity and reliability is the cornerstone to identifying whether a research used the proper instruments, appropriate procedure and achieved results that are meaningful (Balkin, 2008). Tests of validity and reliability are critical to ensure that the research instrument that has been developed to measure a construct, is indeed measuring that variable (Sekaran & Bougie, 2014).

#### **3.18.1 Validation**

According to Sekaran and Bougie (2014), validity tests can fall into three broad groups:

- ❖ Content validity – This ensures that the concept is captured by the measure which needs to have a set of items that are both adequate and representative. It focusses on the concept with a view of assessing how well its elements and dimensions have been portrayed. A panel of judges, for example, can be used to attest that the instrument used for the measure adequately covers and represents the topic being studied. It involves analysis and evaluation of the content of the measure in a logical way (Balkin, 2008).

- ❖ **Criterion-related validity** – It assesses how well a test is suited for use in the prediction of some future performance (Kothari, 2004). It is established when there is differentiation between individuals by a measure based on a criterion it seeks to predict (Sekaran & Bougie, 2014). Its establishment can be subdivided into concurrent validity, when the scale discriminates between individuals who are known to be different, and predictive validity, which indicates the ability of the measuring instrument to differentiate among individuals with reference to a future criterion (Sekaran & Bougie, 2014).
- ❖ **Construct validity** – This bears testimony to how nicely the use of the measure produced results that are in accordance with the theories around which the test is designed (Sekaran & Bougie, 2014).

Content validity for this study was established by means of the feedback obtained from the sales and marketing division of SA Calcium Carbide during the pre-tests of the interview and the questionnaire.

Construct validity was established, as suggested by Sekaran and Bougie (2014), using measures that are published for various concepts relating to interview and questionnaire methods in order for the user or reader to be able to judge the goodness of the measures.

### **3.18.2 Reliability**

Reliability refers to the extent to which measures are accurate and therefore produce results that are consistent (Thanasegaran, 2009). In order to review the reliability of the instruments used in the research, criteria were used as suggested by (Saunders, et al., 2009).

- ❖ **Subject or participant error** – This was avoided by approaching interview participants at periods convenient to them. Ample time was also given to the questionnaire participants not to rush through the responses.

- ❖ **Subject or participant bias** – This was prevented by emphasising to each respondent that anonymity was guaranteed. This was clearly stated before the onset of the interview and also on the cover page of the questionnaire.
- ❖ **Observer error** – This was circumvented by using a structured questionnaire for the SA Calcium Carbide existing customers and a structured interview method for the respondents dealing with the Chinese calcium carbide.
- ❖ **Observer bias** – This was non-existent, as the researcher used the interview and the questionnaire research designs.

Summarily, every effort was made to ensure that the research was conducted impartially and that the interpretation of the data was done using a scientific and objective approach. There is therefore every reason to believe that if other researchers were to carry out the same study the results would be comparable.

### 3.19 Data analysis

Mixed analysis is the description of the method used for analysing collected data in a mixed method research type. It entails the application of both quantitative and qualitative techniques of analysis inside the same research framework (Onwuegbuzie & Combs, 2010).

The following is a process detailing the seven steps that have to be followed for mixed analysis (Onwuegbuzie & Teddlie, 2003).

- ❖ Reduction of data, which entails the reduction of the dimensionality of both the quantitative data and qualitative data,
- ❖ Display of data, which involves use of visual aids such as graphs to describe the data,
- ❖ Transformation of data,
- ❖ Correlation of data,



- ❖ Data consolidation,
- ❖ Comparison of data and
- ❖ Data integration.

The steps outlined above were duly followed for the analysis of results, as this study employed mixed research methods for the collection of the data. The next chapter shall dwell deeper in how each step was applied.

### **3.20 Summary**

The research methodology employed for this study was described in detail in this chapter. The background to the study, its justification and the objectives sought to be achieved have been restated for emphasis. The research design, sampling technique, data collection and subsequent analysis utilised in the study are also detailed with the guidelines from literature pertaining to use of such methods forming the basis of the methodology. The following chapter dwells on the presentation of research findings obtained from this study.

## **CHAPTER 4**

### **Presentation of findings**

#### **4.1 Introduction**

In this chapter the data collected from the responses to both the questionnaire and the interview questions is presented in the form of descriptive and inferential statistics. The chapter is organised in two sections, with the first part focussing on the responses captured using the questionnaire that was administered on the current customers of S.A Calcium Carbide (Pty) Ltd, and the second part concentrating on the responses obtained from the interviews done with both traders and manufacturers of Chinese calcium carbide.

Of the 110 subjects targeted, a total of 88 participated in the study, giving a response rate of 80 percent. The split for the respondents was 78 out of 100 for the questionnaire and 10 out of 10 for interview participation.

#### **4.2 Questionnaire responses**

The presentation of the questionnaire results was done according to the following categories:

- ❖ Demographic profile of participants
- ❖ S.A Calcium Carbide product quality
- ❖ S.A Calcium Carbide lead times for product delivery
- ❖ S.A Calcium Carbide before and after sales support
- ❖ S.A Calcium Carbide product price
- ❖ S.A Calcium Carbide reputation
- ❖ Narrative text for other reasons for buying from S.A Calcium Carbide (Pty) Ltd.

For calcium carbide originating from China

- ❖ Product quality
- ❖ Lead times for product delivery
- ❖ After sales and before sales support
- ❖ Pricing of product
- ❖ Narrative text for any other comments regarding Chinese calcium carbide.

### 4.3 Demographic profile of respondents

The demographic profile of the current S.A Calcium Carbide (Pty) Ltd customers included the continent located (from the country given), the nature of the business, the quantity of calcium carbide handled per year, the experience in the industry and the application of the product after purchase. This information was critical in the determination of whether the differences in these factors had a bearing on the responses to the ensuing assessment questions.

#### 4.3.1 Continent located

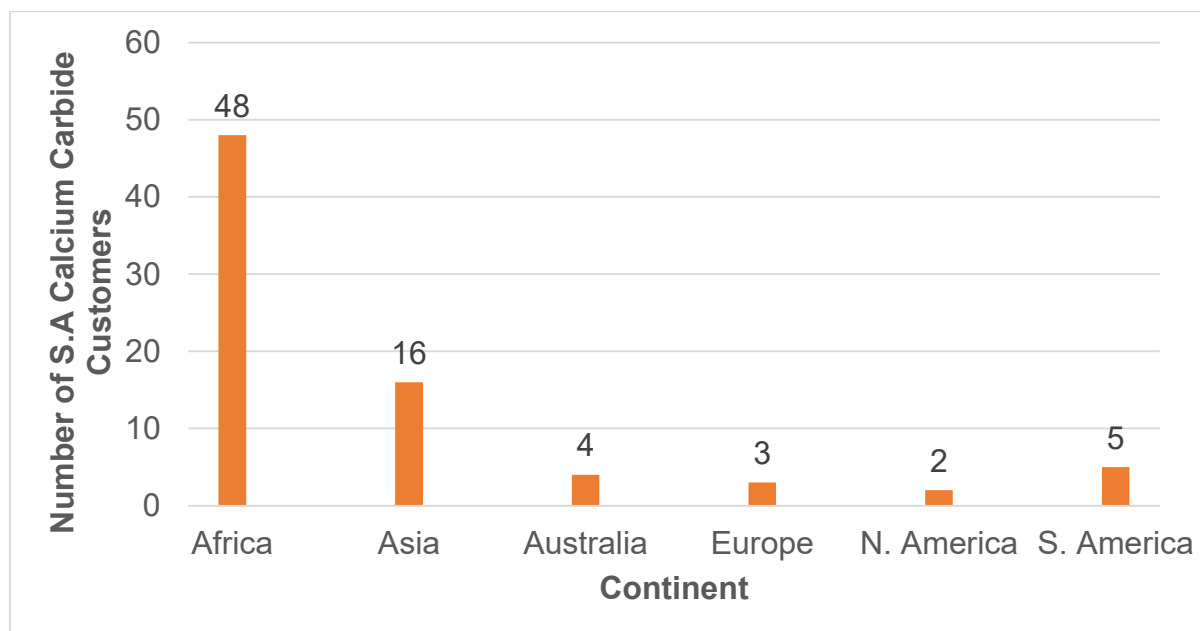
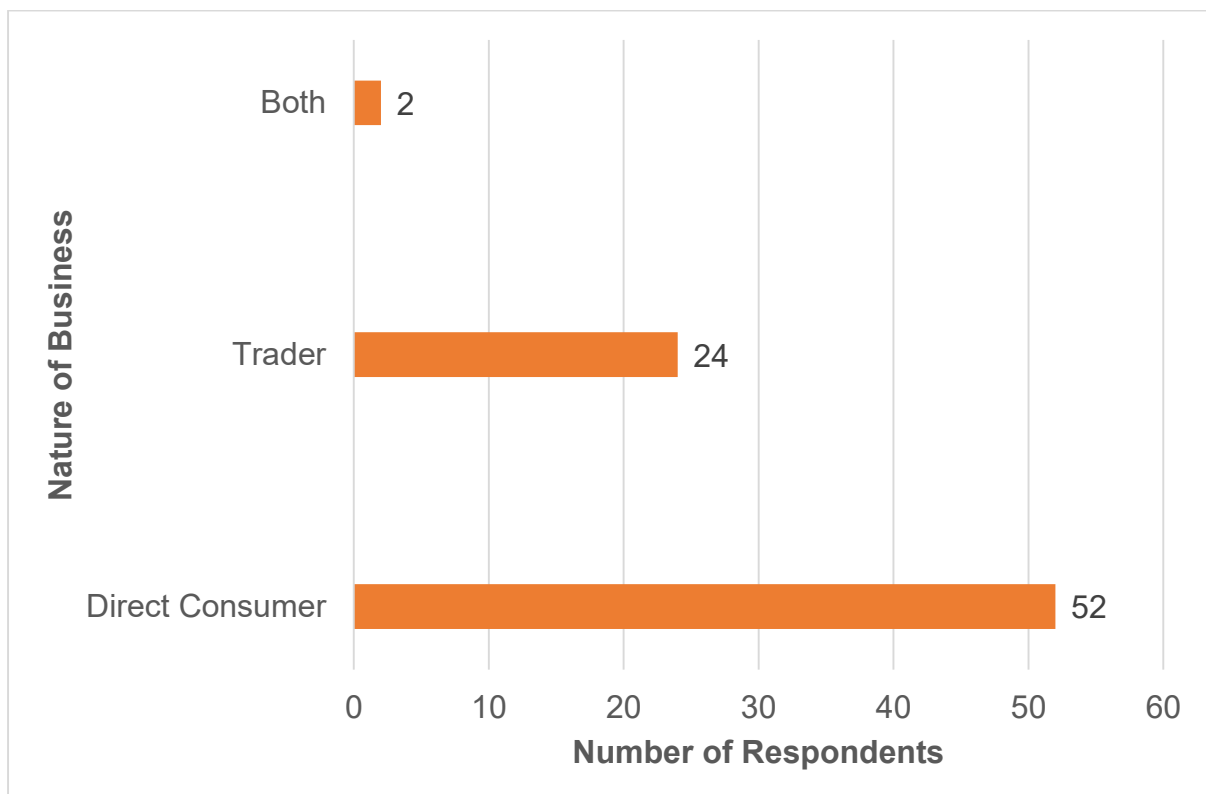


FIGURE 4.1 CONTINENT DEMOGRAPHICS OF RESPONDENTS

**TABLE 4.1 FREQUENCIES TABLE SHOWING CONTINENT DEMOGRAPHIC OF RESPONDENTS**

	Frequency	Percent	Cumulative percent
Africa	48	61.5	61.5
Asia	16	20.5	82
Australia	4	5	87
Europe	3	4	91
North America	2	2.5	93.5
South America	5	6.5	100
TOTAL	<b>78</b>	<b>100</b>	<b>100</b>

#### 4.3.2 Nature of business

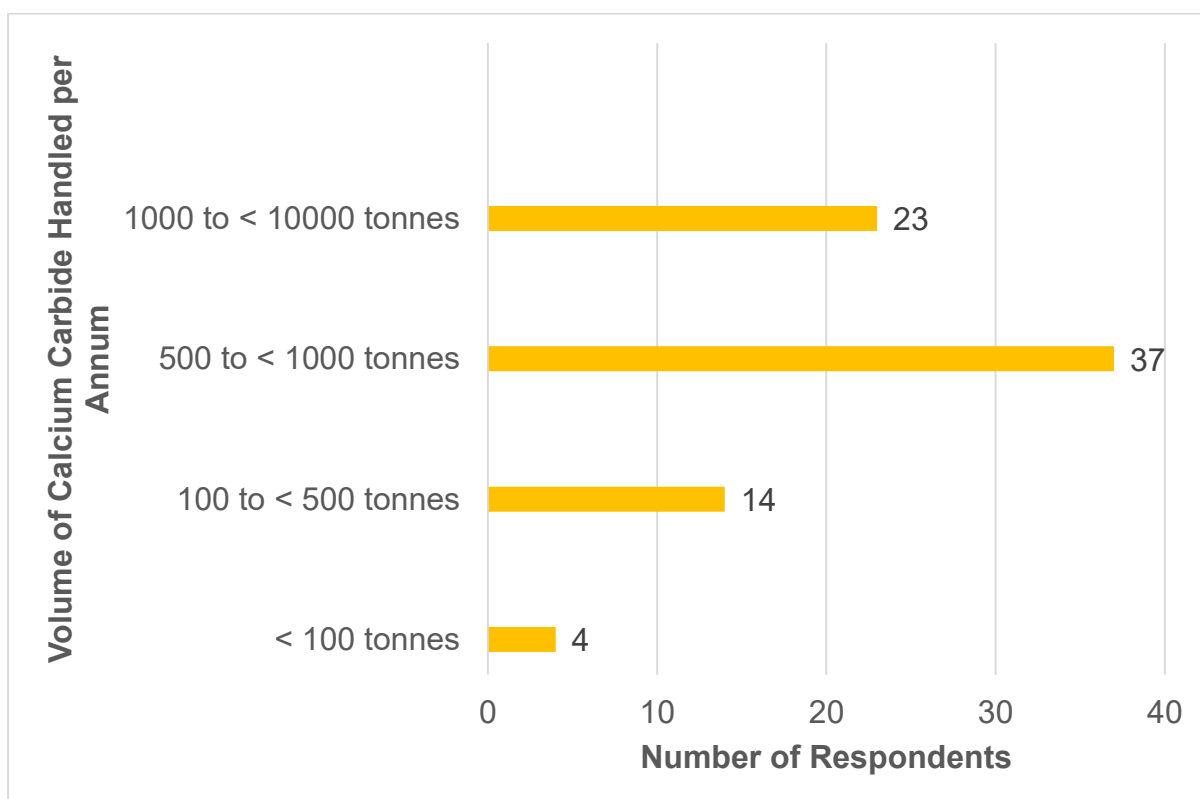


**FIGURE 4.2 TYPE OF BUSINESS DEMOGRAPHICS OF RESPONDENTS**

**TABLE 4.2 FREQUENCIES TABLE SHOWING NATURE OF BUSINESS DEMOGRAPHICS OF RESPONDENTS**

	Frequency	Percent	Cumulative percent
Trader	24	30.8	30.8
Direct Consumer	52	66.7	97.5
Both	2	2.5	100
<b>TOTAL</b>	<b>78</b>	<b>100</b>	<b>100</b>

#### 4.3.3 Quantity of calcium carbide handled per annum

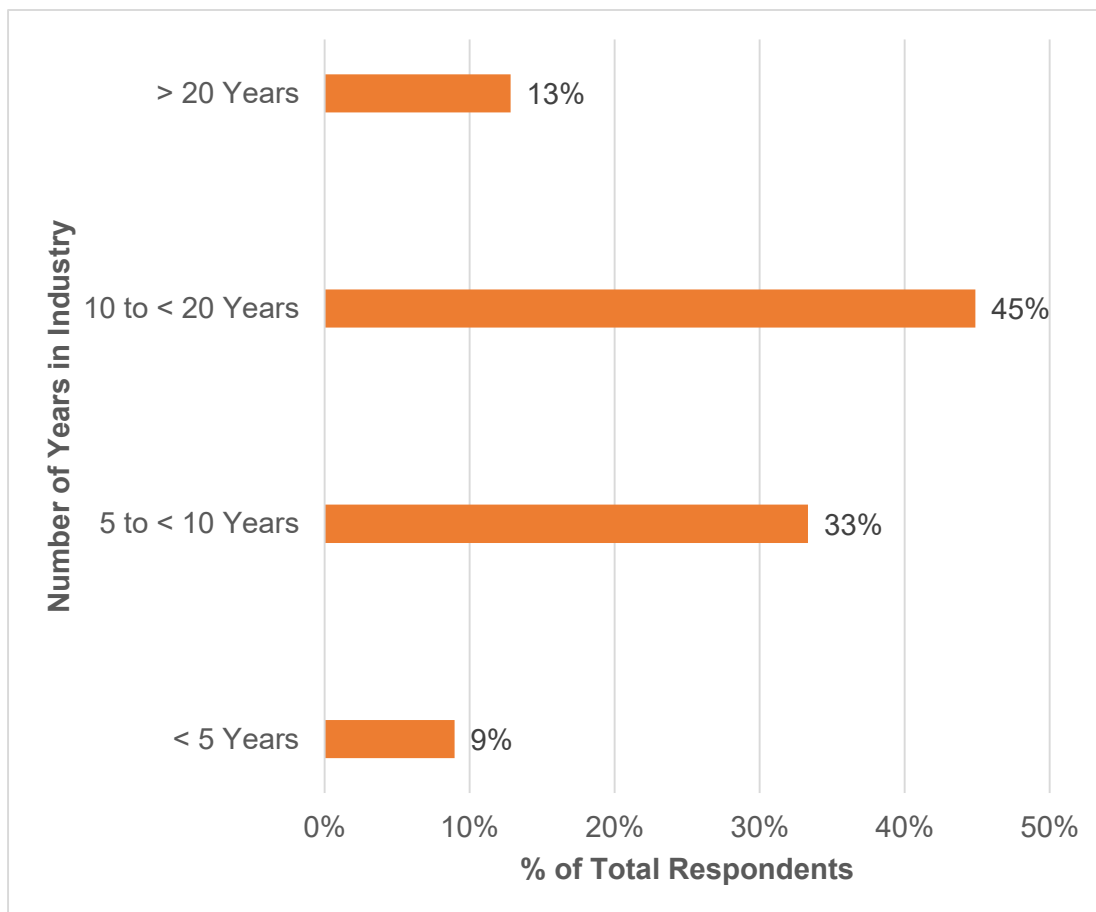


**FIGURE 4.3 NUMBER OF RESPONDENTS AND CARBIDE HANDLED PER YEAR**

**TABLE 4.3 FREQUENCIES TABLE QUANTITY OF CALCIUM CARBIDE HANDLED PER ANNUM**

Tonnages	Frequency	Percent	Cumulative Frequency
< 100	4	5	5
100 to < 500	14	18	23
500 to < 1000	37	47.5	70.5
1000 to < 10000	23	29.5	100
TOTAL	<b>78</b>	<b>100</b>	<b>100</b>

#### 4.3.4 Calcium carbide industry experience



**FIGURE 4.4 CALCIUM CARBIDE INDUSTRY EXPERIENCE DEMOGRAPHIC OF RESPONDENTS**

### 4.3.5 Calcium carbide application

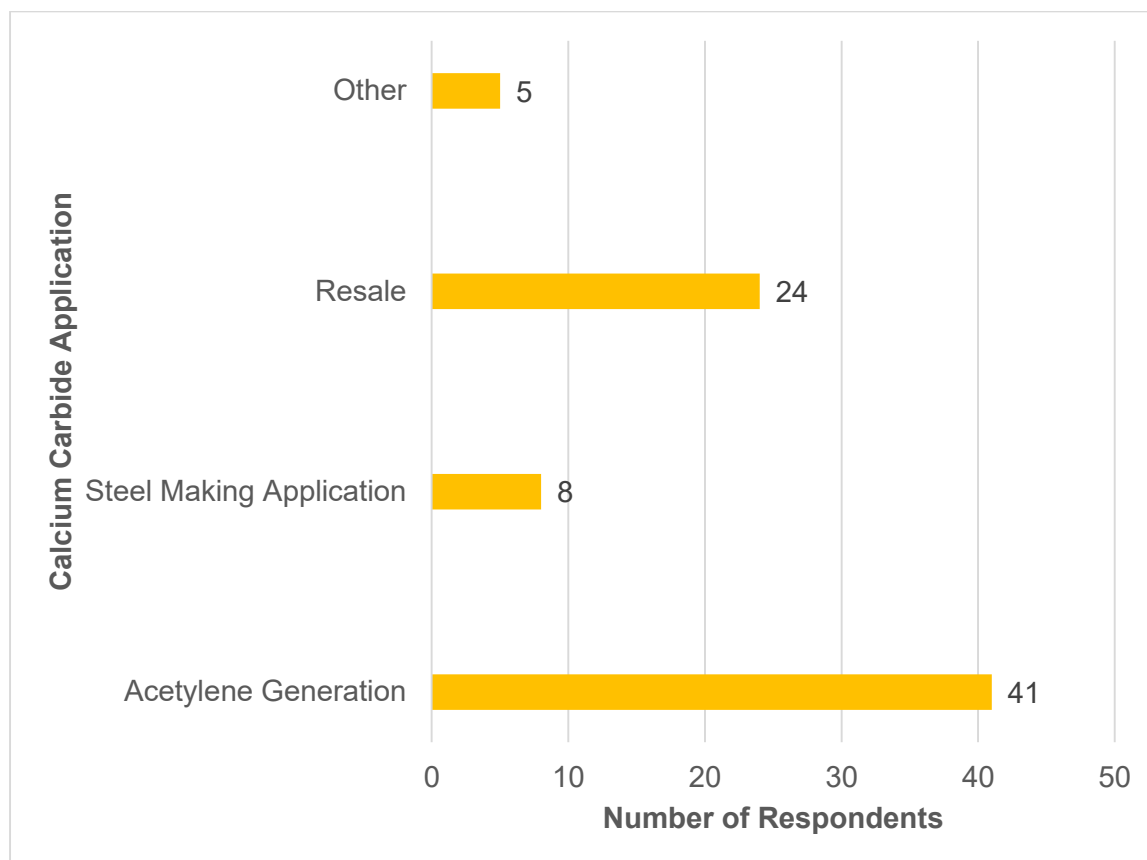


FIGURE 4.5 CALCIUM CARBIDE APPLICATION DEMOGRAPHICS OF RESPONDENTS

TABLE 4.4 FREQUENCY TABLE FOR CALCIUM CARBIDE APPLICATION DEMOGRAPHIC

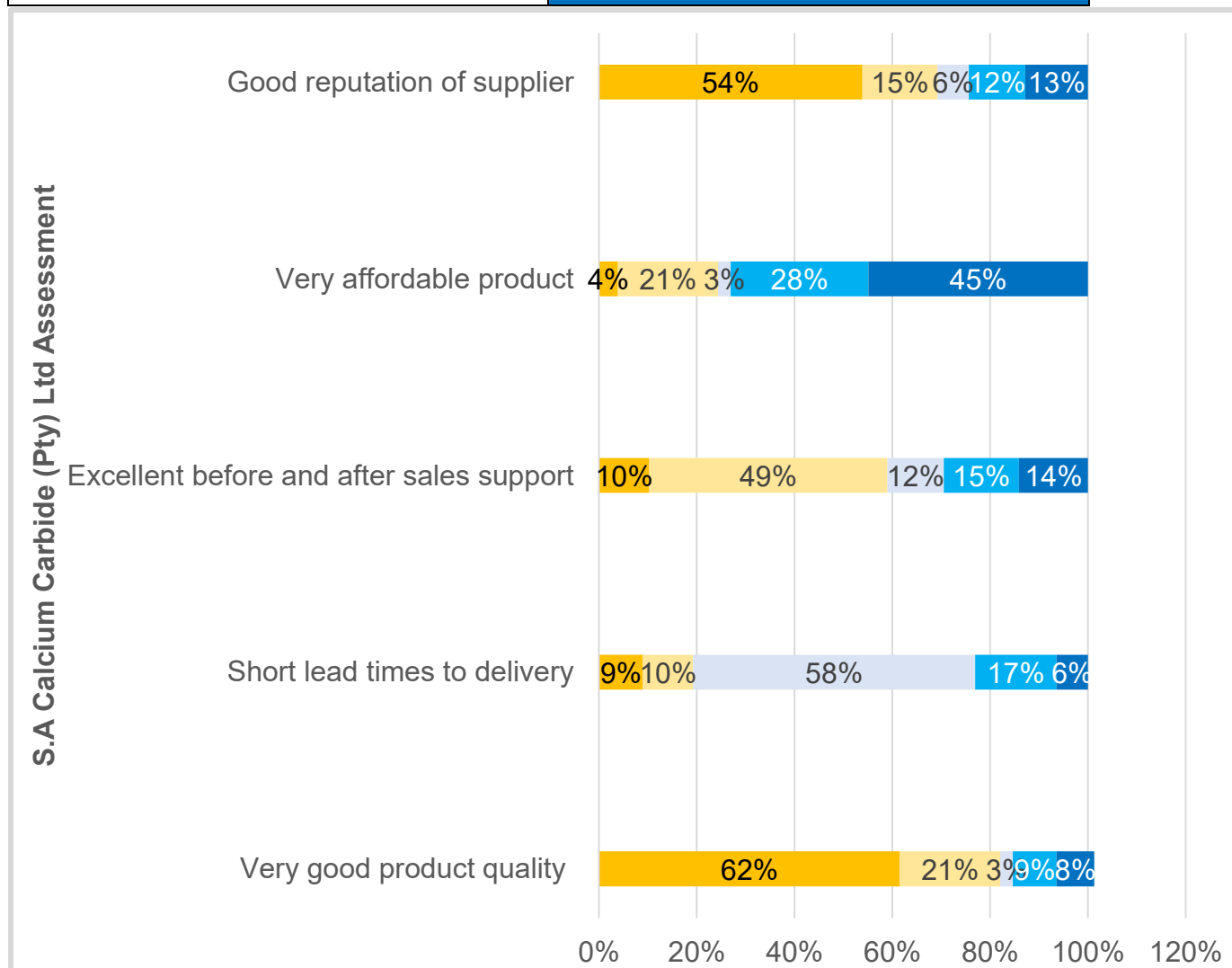
Application	Frequency	Percent	Cumulative Frequency
Other	5	6.5	6.5
Resale	24	30.7	37.2
Steel making	8	10.3	47.5
Acetylene generation	41	52.5	100
TOTAL	78	100	100

#### 4.4 S.A Calcium Carbide product assessment designed for objective 1

**Objective 1:** Find out what motivates current customers to buy from S.A Calcium Carbide. The study covered domestic, regional and international SACC customers.

The following colour legends were used in the graphs

Response Option	Colour Code
Strongly Agree	Yellow
Agree	Light Yellow
Neither Agree or Disagree	Light Blue
Disagree	Blue
Strongly Disagree	Dark Blue



**FIGURE 4.6 ASSESSMENT OF RESPONDENTS' VIEW OF SA CALCIUM CARBIDE**



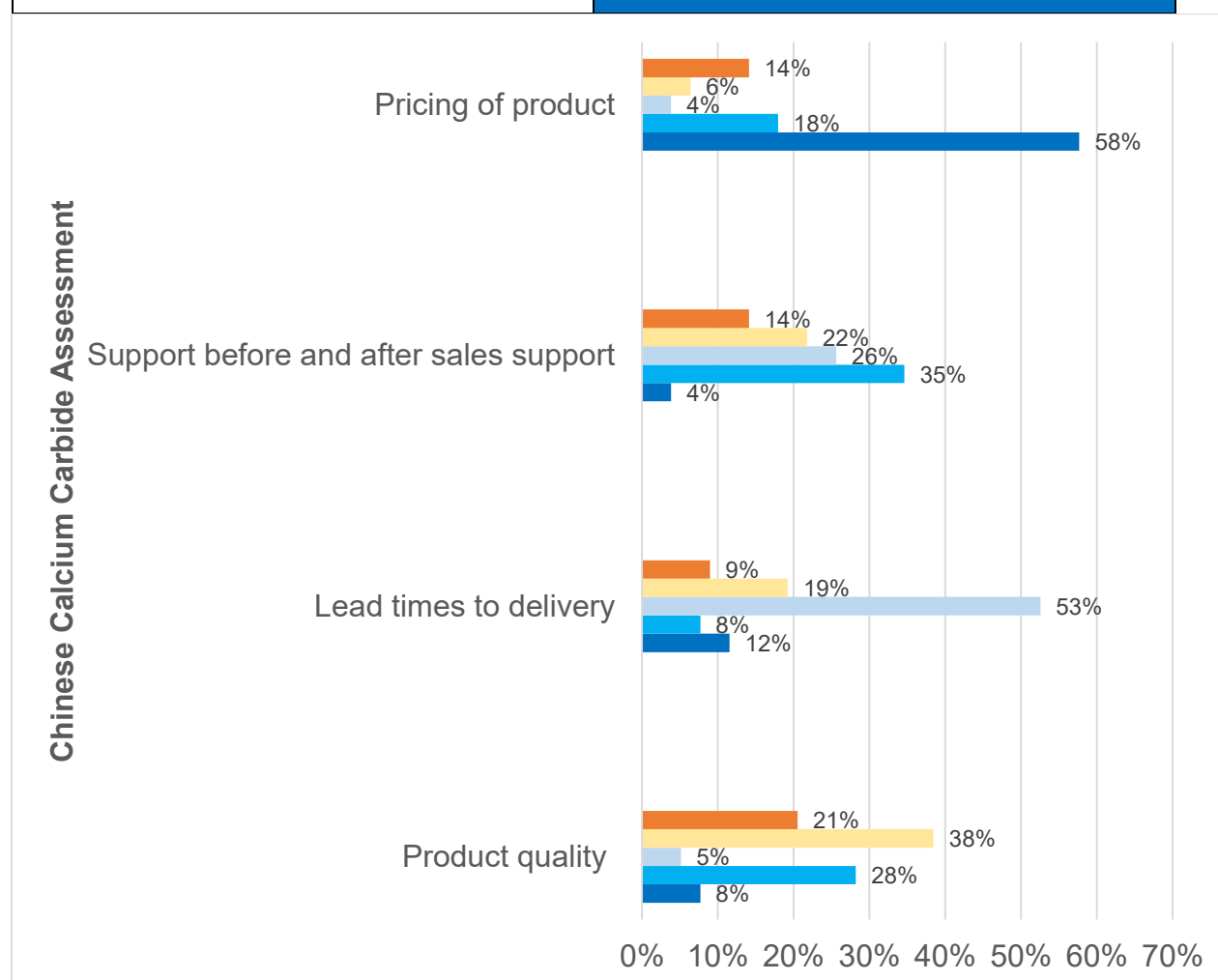
#### 4.5 Chinese product assessment designed for objective 3 and objective 4

**Objective 3:** Establish how real the threat is posed by the Chinese products to a company such as S.A Calcium Carbide. This was achieved through assessment of the current customers' views with regard to the Chinese product.

**Objective 4:** Investigation of what the value proposition is for Chinese manufacturers and traders and what sustains it.

The following colour legends were used in the graphs

Response Option	Colour Code
Very Bad	Orange
Bad	Yellow
Neither Good nor Bad	Light Blue
Good	Blue
Very Good	Dark Blue



**FIGURE 4.7 ASSESSMENT OF RESPONDENTS' VIEW OF CALCIUM CARBIDE FROM CHINA**

#### **4.6 Interview responses assessment of Chinese manufacturers and traders**

The presentation of the Interview results was done according to the following categories:

- ❖ Demographic profile of participants
- ❖ Assessment of the importance of capabilities driving companies' profitability
- ❖ Narrative text of other responses obtained.

Of the 10 companies that participated in the interviews out of the 10 targeted, 5 were manufacturers of calcium carbide based in China and 2 were traders of calcium carbide based in United Arab Emirates, one a trader based in Oman and the other 2 traders based in South Africa.

#### **4.7 Demographic profile of interview respondents**

The demographic profile of the respondents dealing in Chinese manufactured calcium carbide included the country located, the nature of the business, the quantity of calcium carbide handled per year, the experience in the industry and the source of main raw materials. This information was critical in the determination of whether the differences in these factors had a bearing on the responses to the ensuing interview questions.

#### 4.7.1 Country located

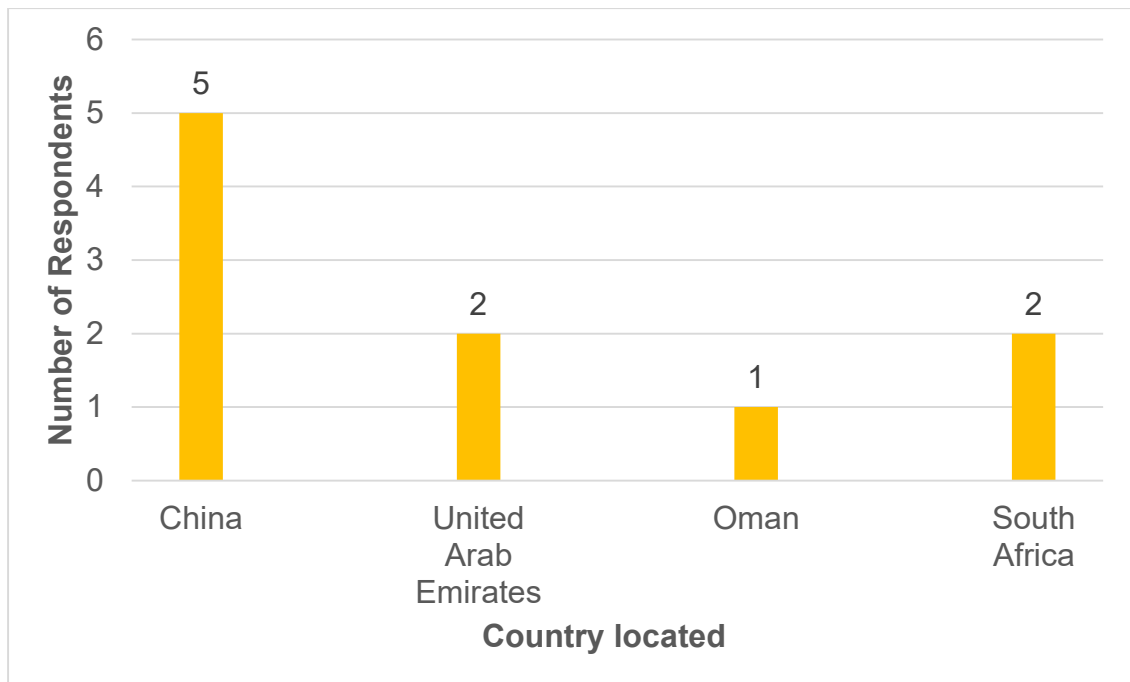


FIGURE 4.8 COUNTRY DEMOGRAPHIC OF INTERVIEW RESPONDENTS

TABLE 4.5 FREQUENCY TABLE OF COUNTRY DEMOGRAPHIC

	Frequency	Percent	Cumulative percent
China	5	50	50
UAE	2	20	70
Oman	1	10	80
South Africa	2	20	100
<b>TOTAL</b>	<b>10</b>	<b>100</b>	<b>100</b>

#### 4.7.2 Nature of business

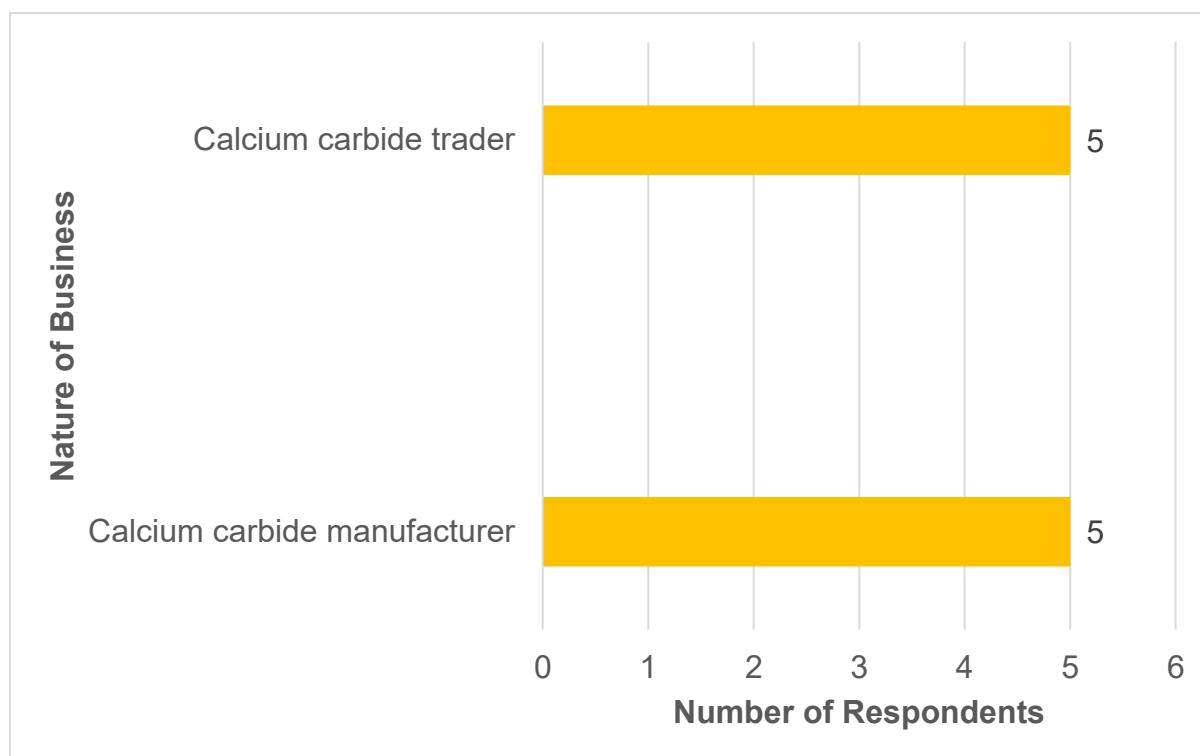


FIGURE 4.9 TYPE OF BUSINESS DEMOGRAPHIC OF RESPONDENTS

TABLE 4.6 NATURE OF BUSINESS DEMOGRAPHIC FREQUENCY TABLE

	Frequency	Percent	Cumulative percent
Trader	5	50	50
Manufacturer	5	50	100
TOTAL	10	100	100

### 4.7.3 Quantity of calcium carbide handled per annum

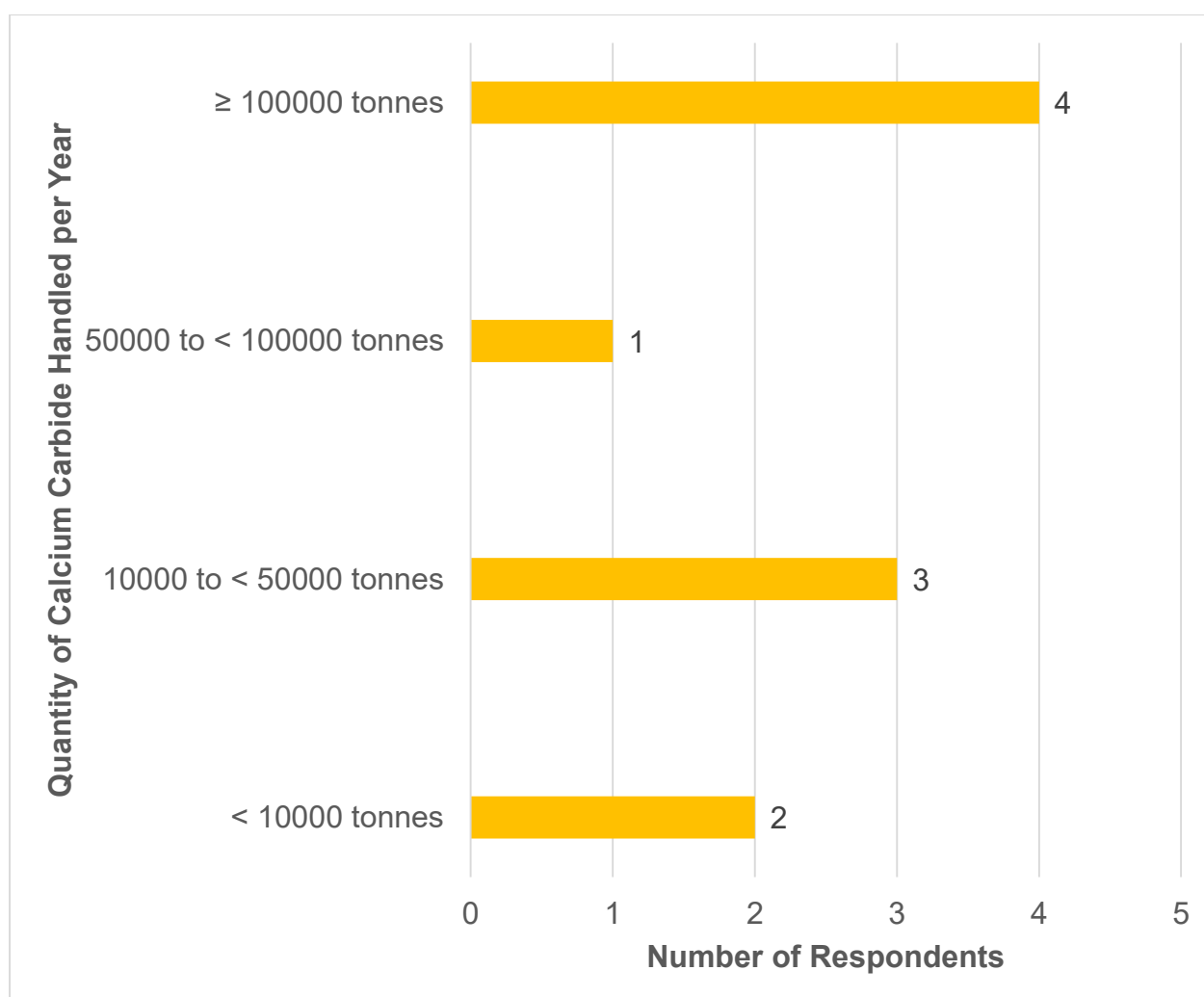
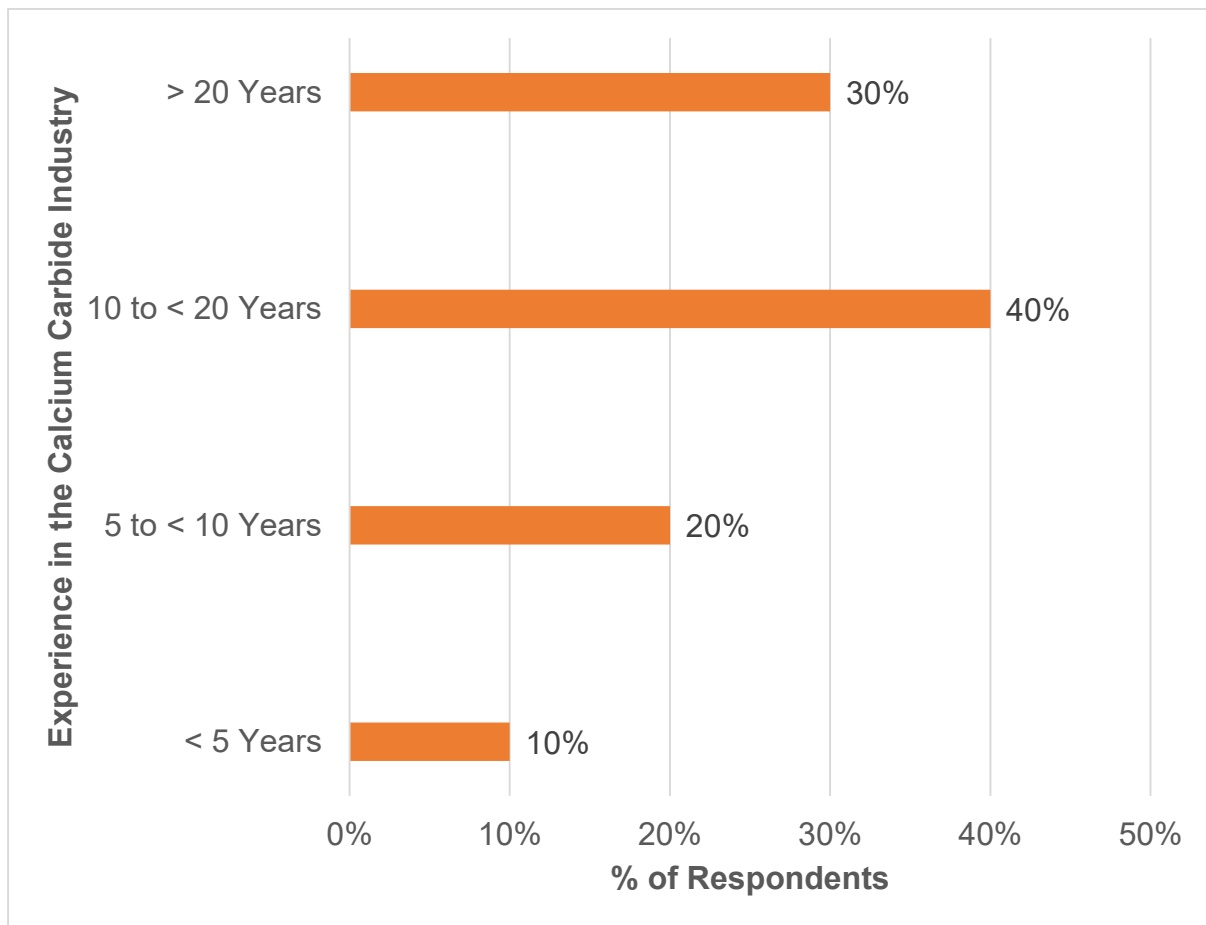


FIGURE 4.10 NUMBER OF RESPONDENTS AND CARBIDE QUANTITY HANDLED PER YEAR

TABLE 4.7 FREQUENCY TABLE OF CALCIUM CARBIDE HANDLED PER YEAR

Tonnages	Frequency	Percent	Cumulative Frequency
< 10000	2	20	20
10000 to < 50000	3	30	50
50000 to < 100000	1	10	60
≥ 100000	4	40	100
<b>TOTAL</b>	<b>10</b>	<b>100</b>	<b>100</b>

#### 4.7.4 Industry experience of Chinese manufacturers or traders



**FIGURE 4.11 CALCIUM CARBIDE INDUSTRY EXPERIENCE DEMOGRAPHIC OF INTERVIEW RESPONDENTS**

#### 4.7.5 Source of raw materials for Chinese calcium carbide manufacturers

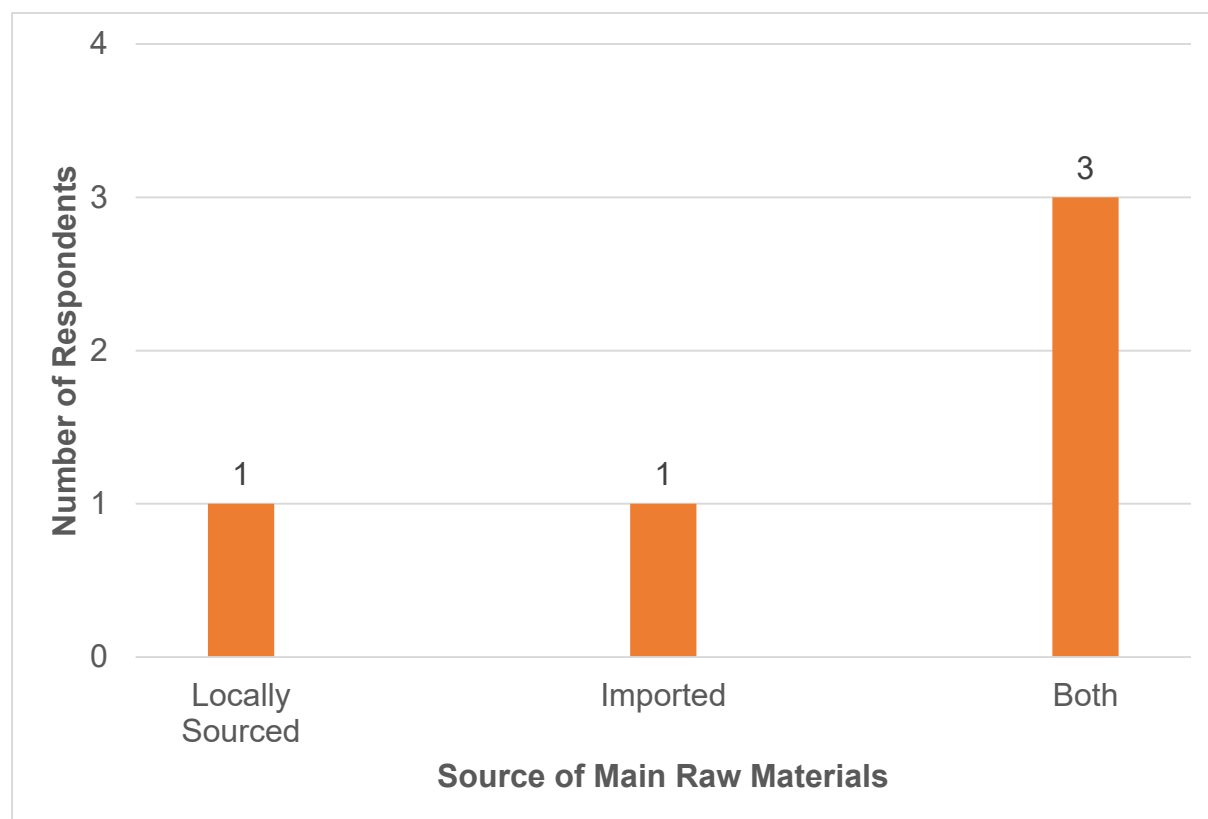


FIGURE 4.12 SOURCE OF MAIN RAW MATERIALS DEMOGRAPHICS OF RESPONDENTS

TABLE 4.8 FREQUENCY TABLE OF SOURCE OF RAW MATERIALS

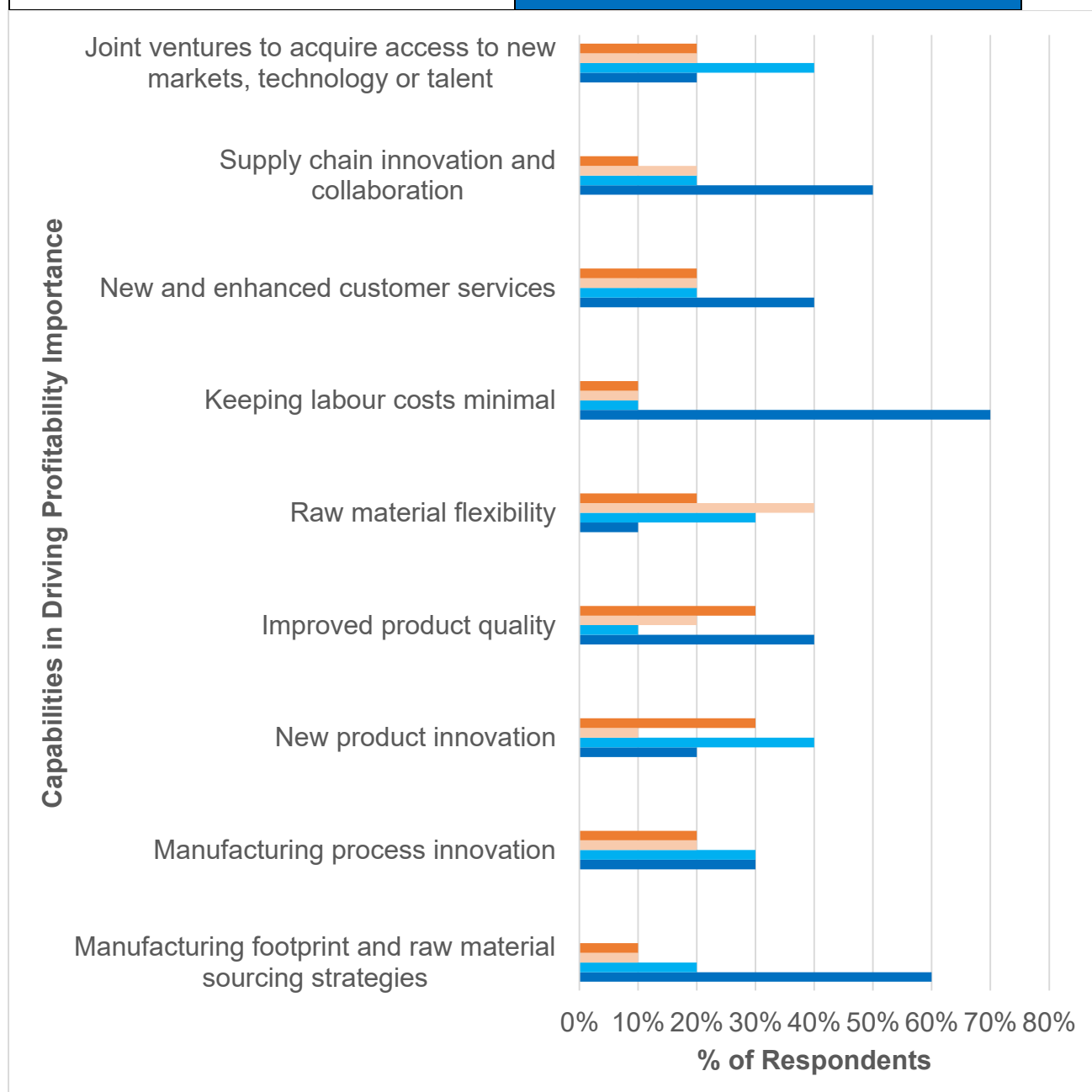
Main Raw Materials	Frequency	Percent	Cumulative Frequency
Locally Sourced	1	20	20
Imported	1	20	40
Both	3	60	100
TOTAL	5	100	100

#### 4.8 Capabilities driving Chinese companies profitability assessment [Objective 4]

**Objective 4:** Investigation of what the value proposition is for Chinese manufacturers and traders and what sustains it.

The following colour legends were used in the graphs

Response Option	Colour Code
Not Very Important	Orange
Not Important	Yellow
Important	Light Blue
Very Important	Dark Blue



**FIGURE 4.13 ASSESSMENT OF RESPONDENTS' VIEW OF CAPABILITIES ESSENTIAL FOR PROFITABILITY**



## 4.9 Summary

The data collected was both a reflection of the participants' personal views and the facts already captured in the companies' databases. The information that emerged from the collected data provided the researcher with a basis to articulate the various facets encapsulated in the research objectives. This was achieved through employment of both quantitative and qualitative approaches to gather the data. The questionnaire was designed specifically for existing S.A Calcium Carbide customers spread across the world, with the questions seeking to elicit responses that would shed light on what counts on the company's favour at present and to capture their views on the Chinese product present in the market. The aim was thus to evaluate the threat posed by the presence of the substitute product and ultimately decide how S.A Calcium Carbide can remain competitive and thus retain existing or increase market share.

On the other hand interviews were done with the major producers of calcium carbide in China with the aim of assessing what makes them competitive and to comprehend what they consider as their value proposition. Traders solely dealing in calcium carbide from China were also targeted for the interviews. Prices of calcium carbide were obtained by checking current invoices and the historical figures mainly from interviews.

The next Chapter focusses on the interpretation and discussion of the research findings with comparisons drawn with existing literature and previous studies.

## **CHAPTER 5**

### **Interpretation and discussion of findings**

#### **5.1 Introduction**

This chapter provides a discussion of the research findings of the study. These are interpreted and explained in conjunction with literature review. Each of the questions and responses from both the questionnaire and the interview is discussed in detail. Later in the chapter the aims and objectives of this study are addressed with data collected forming the basis of the discussion.

#### **5.2 Discussion of the findings from the questionnaire responses**

##### **5.2.1 Continent located**

The demographic question sought to find out about the geographical location of the current S.A Calcium Carbide customers and thus to be able to better understand that particular market. Sixty one point five per cent of the respondents were from Africa and about 20.5% from Asia. The balance were from Europe, Australia, North America and South America. This spread typifies the global footprint of S.A Calcium Carbide customers, as most of them are within the African content. This is mainly because the company is the sole manufacturer of calcium carbide in the region.

##### **5.2.2 Nature of business**

Fifty two of the respondents were direct consumers of calcium carbide, representing 66.7% of the respondents with 30.8% being traders. The balance of 2.5% represents those that would not only use calcium carbide for their business but would also sell some of the product purchased from S.A Calcium Carbide to the informal market dominated by small consumers. It is apparent from the results that the company deals mostly with direct users of the product which allows it to offer also direct support and thus easily forge good customer relations.

### **5.2.3 Quantity of calcium carbide handled per annum**

From the cumulative frequency table, it is evident that 70.5% of S.A Calcium Carbide customers handle a total of less than 1000 tonnes of calcium carbide. This points to the fact that most of the customers are relatively small in size, although they are many. This necessitates the need to retain their market, because any import penetration would significantly reduce the sales volumes of S.A Calcium carbide. The balance of 29.5% depicts those customers that can be termed major as they consume in excess of 1000 tonnes per year. Their buyer power is obviously high in terms of negotiations for prices.

### **5.2.4 Calcium carbide industry experience**

The demographic question was designed to find out how long the respondent has been operating in the industry. This was important so as to be able to gauge if that particular customer had some form of loyalty to S.A Calcium Carbide and thus had less likelihood of switching to another supplier. Forty five per cent of the respondents have been in the industry of calcium carbide for more than 10 years, whilst 13% of the respondents have been in operation in excess of 20 years. Only 9% of the customers are relatively new in the business with less than 5 years in operation.

### **5.2.5 Calcium carbide application**

This question sought to better understand the profile of the customers of S.A Calcium Carbide by knowing exactly what they used the calcium carbide purchased for. This is particularly important, especially because other applications require high levels of quality of the product, and the nature of the process does not encourage switching to a different product as this would destabilise the already optimised process. Most of the customers (52.5%) use the calcium carbide for acetylene generation. Acetylene gas is in turn used for welding purposes (Andina Group, 2008). Thirty point seven per cent of the customers buy the calcium carbide for resale mostly to the informal market and to other companies that S.A Calcium Carbide does not have direct contact. These sales range, for a variety of reasons, from political to inaccessibility.

Steel making constitutes 10.3%, where carbide is used as a desulphurising agent or as an anti-oxidant of slag (Andina Group, 2008).

### **5.3 S.A Calcium Carbide product assessment designed for objective 1**

**Objective 1** sought to find out what motivates current customers to buy product from S.A Carbide Customers. The customers as already explained beforehand, are spread across the whole world. The questions were variations of the 'agree' and 'disagree' words as can be seen from Figure 4.6.

#### **5.3.1 Good reputation of supplier**

Although a good reputation is an intangible concept, it can be beneficial to a business in various ways such as getting the preference of the consumers and raising the 'future value of an organisation in the marketplace' (Bracey, 2015). A sizeable percentage of the customers (54%), strongly agree that S.A Calcium Carbide has a good reputation as a supplier of calcium carbide. However on the contrary, about 25% of the customers, mostly in overseas markets, were not driven by the reputation of the company in the first place in placing orders for calcium carbide. Six per cent were indifferent to the question, neither agreeing nor disagreeing.

#### **5.3.2 Very affordable product**

It was very evident from the responses to this question that most customers consider the product from S.A Calcium Carbide very expensive. This can be seen from the 45% proportion of the respondents strongly disagreeing with the statement that the product was very affordable. A cumulative percentage of 73% feel the product is expensive. Only 4% of the respondents strongly agreed that the product was very affordable given the high product quality. This perception is worrisome as it opens up the market to import penetration especially from China.

### **5.3.3 Excellent before and after sales support**

Due to stiff competition in the global market, dwindling profits in the sales of primary products, stagnating revenues etc., businesses have resorted to expanding their after sales support to boost sales, build loyalty of customers and to enhance their portfolio differentiation (Jönke, 2012). The results show that 59% of the respondents concur that SA Calcium Carbide gives excellent before and after sales support, with 10% of those choosing the strongly agree option. A sizeable percentage (29%), think otherwise. Of the total respondents, 12% were not decided on how to rate SA Calcium Carbide in terms of this particular measure.

### **5.3.4 Short lead times to delivery**

The lead time can be described as a period of time from the instant a request for a product is made until the time when the product is delivered to the customer (Simeonovova & Simeonov, 2012). It is evident from the collected results that this measure was not so easy to comment on especially for SACC, as 58% chose the neither agree nor disagree option. This could be mainly because the lead times are pretty much standard depending on geographical location and shipping companies in use. Nineteen per cent of respondents agreed that the lead times were relatively shorter with the balance of about 23% believing otherwise. It therefore means that delivery times were not ranked very highly on the list by customers as to why they were buying product from SA Calcium Carbide.

### **5.3.5 Very good product quality**

This product characteristic ranks very high in consideration when customers buy calcium carbide for applications such as acetylene generation and steel making (Kwakernaak, 2015). He further stated that the quality of the calcium carbide is measured in terms of its potential to generate acetylene gas, because the higher the gas yield the better the quality of the product. Only 17% of the respondents did not regard the quality of the product from SACC as of prime quality. This opinion was predominantly from the customers based in Europe, probably because they have had exposure to superior quality at some point in their existence. Eighty three per cent believed the product was of very good quality, with 62% of those actually choosing the strongly agree option.

## **5.4 Chinese product assessment designed for objective 3 and objective 4**

**Objective 3:** Establish how real is the threat posed by the Chinese products to a company such as S.A Calcium Carbide. This would be achieved through assessment of the current customers' views with regard to the Chinese product.

**Objective 4:** Investigation of what the value proposition is for Chinese manufacturers and traders, and what sustains it. This would be achieved in this case from the SA Calcium Carbide customers' perspective.

### **5.4.1 Pricing of product**

According to Adams and Gangnes (2006), China's export competitiveness in terms of pricing of goods is not monocausal, but is a culmination of several factors such as a favourable exchange rate, abundance of unskilled labour (hence low wages) and the encouragement of the Chinese foreign trade policy. The results obtained from the study show that 58% of the respondents believe that the price offered by the Chinese is very good. This is of particular concern to SACC as this kind of response was coming from its own customers. A further 18% of the SACC customers in the study also described the Chinese price as good which translates to low. Only a fifth of the total respondents thought the way the Chinese were pricing their product was bad, probably because it sent the wrong signals regarding the quality of the product to be expected.

### **5.4.2 Before and after sales support**

Contrary to the view of most of the SACC customers regarding good sales support from the company, only 4% of the customers deem the support offered by the Chinese firms as very good. However 35% still believe that although the before and after sales support is not exceptional, it is still good enough. Such an endorsement of the Chinese firms poses a threat to SA Calcium Carbide, as it then means that the competition offers goods at low price and still is prepared to follow up and provide support after the sales deal has been concluded.

It gives the impression to the consumers then that despite the suspiciously low price of the product, the suppliers are prepared to back it up and ensure that nothing is compromised downstream of processes during application of the product.

#### **5.4.3 Lead times to delivery**

A large percentage of the respondents, 53%, was undecided on whether the potential calcium carbide suppliers from China offered shorter delivery times from the time of order placement to the time of product delivery. A total of about 20% considered the delivery times proposed by the Chinese firms as acceptable, whilst about 28% of the consumers felt that the delivery times were too long, considering the freight costs they would have incurred. The nature of the responses to this question were largely dependent on the geographical location of the customer. Considering that most of the respondents were from Africa, sourcing product from China would obviously take longer compared to sourcing from within the continent albeit at a higher price.

#### **5.4.4 Product quality**

The proportion of respondents that believed the quality of the Chinese calcium carbide was bad was 38% with a further 21% describing it as very bad. From the comments given to explain this, it was apparent that the negative perception was arrived at from previous trials done with the product and also just by checking the certificates of analysis issued by the Chinese firms whenever they had made a delivery. The major threat posed to SACC though is that more than 36% of the respondents considered the Chinese product as good, with 8% of them actually choosing the 'very good' option. This means then that the Chinese firms, from the perspective of existing SACC customers, offer the following value proposition: low priced calcium carbide of good quality and also with the technical teams ready to render technical support during application of product. A lowly 5% of the respondents were not sure about the quality of the products as they had not used them before.

## **5.5 Discussion of the findings from the interview responses**

The demographic profile of the respondents dealing in Chinese manufactured calcium carbide included the country located, the nature of the business, the quantity of calcium carbide handled per year, the experience in the industry and the source of main raw materials. This information was critical in the determination of whether the differences in these factors had a bearing on the responses to the ensuing interview questions.

### **5.5.1 Country located and nature of business**

A total of 10 companies participated in the interviews. All of them are currently dealing in Chinese manufactured calcium carbide, with 5 of them being manufacturers and the other 5 being traders. A total of 50% of the respondents are based in China. All the participants based in China are manufacturers of calcium carbide and are in the top 10 of the producers in terms of volumes per year. Of the other 5 trading companies, 2 of them are based in the United Arab Emirates, one in Oman and the other 2 are in South Africa.

### **5.5.2 Analysis of quantity of calcium carbide handled per year**

Of the participants, 4 of them manufacture calcium carbide in excess of 100000 tonnes per year in China. The other company, also a manufacturer and based in China, handles volumes of carbide of between 50000 and 100000 tonnes per year. Thirty percent of the interview participants, based in the UAE and Oman, handle volumes of between 10000 and 50000 tonnes of calcium carbide. The traders based in South Africa handle less than 10000 tonnes volume per year, most probably because of the monopoly enjoyed by SA Calcium Carbide in the country.



### **5.5.3 Industry experience of Chinese manufacturers or traders**

Seventy percent of the interview participants have been in the calcium carbide industry for more than 10 years. Twenty percent represent the companies that have been operational for more than 5 years but less than 10 years. Only one of the companies was less than 5 years old. This meant that the opinions derived from the participants were based on many years of experience and thus were very integral to the study.

### **5.5.4 Source of main raw materials for Chinese calcium carbide manufacturers**

According to the China Chemical Report (2009), the country has sufficient coal reserves to last it the next 200 years and it also has lime resources in abundance. These are the main raw materials for the production of calcium carbide. It is therefore surprising that of the 5 big calcium carbide manufacturers interviewed, only 20% source their raw materials in their entirety locally. This is because China still imports coal despite high local outputs, because of the bottlenecks surrounding the transportation from the mines by rail to the intended users, and also the safety and environmental concerns associated with the mining of the coal (Umulawan, 2013). Three of the companies source the main raw materials both locally and internationally. This still gives them a competitive edge in the global market because of the export promoting policies in place as discussed in the literature review.

## **5.6 Capabilities driving Chinese companies' profitability assessment**

**Objective 4:** Investigation of what the value proposition is for Chinese manufacturers and traders and what sustains it. This assessment sought to achieve this same objective but from the perspective of the Chinese manufacturers and the traders of their products.

**Objective 5:** Draw up a list of recommendations on what strategies companies such as SA Calcium Carbide can employ to remain competitive and retain existing market share whilst still operating profitably and in a sustainable manner.

### **5.6.1 Importance of joint ventures**

The results obtained show that more than 60% of the participants in the interview believe that it is important to form joint ventures as it would allow the acquisition of new markets, technology and talent. When two or more business partners from jurisdictions that are separate come together to exchange resources, share risks or divide the proceeds from a joint enterprise, then their association can be described as a joint venture (Stewart & Maughn, 2011). From the results, it was evident however that 40% of the respondents do not consider forming of joint ventures as an important strategy for acquisition of new markets.

### **5.6.2 Supply chain innovation and collaboration**

Exactly 50% of the respondents described supply innovation and collaboration as very important to operating profitably, even though the products are sold at low price. However 10% thought this was not a very important factor for enhancing profitability. A further 20% of the interview participants also settled for the 'not important' choice of response. The combined proportion for the participants that deemed this factor important was 70%. Based on their experience in the industry as discussed in the demographic section, then adopting this is worth noting as a recommendation for companies such as SA Calcium Carbide.

### **5.6.3 Keeping labour costs minimal**

Labour is one of the major cost drivers in organisations, and if not controlled can drastically reduce profit margins. The results show that 70% of the interview participants consider this factor very important. According to Adams and Gangnes (2006), 'China's enormous rural population and increasing numbers of floating urban workers suggest that it will be many years before the supply of low cost unskilled labour runs out.' The results of the literature review supports this, because a total of 80% of the respondents believe that the labour costs should always be kept minimal. Contrary to this view though, 20% of the respondents said that there are other methods to drive profitability other than taking advantage of desperate people.

### **5.6.4 Raw material flexibility**

Less than 50% of the respondents regarded this factor as very important, as the calcium carbide industry is dominated by lime and coal only, and as such there is not much that an organisation can do to gain leverage in terms of procurement costs.

### **5.6.5 Improved product quality**

A combined total of 50% of the respondents felt that the quality of their products, although good, could be improved further. This they said was important to counteract the negative perception the consumers in the global market had about the quality of Chinese products. They felt that further improvements in the gas yields of the calcium carbide would result in a surge of sales volumes and ultimately increased profitability. The other 50% of the participants however felt that the quality of the Chinese products was already good enough, and thus it was not important to improve the quality further. They felt that aggressive marketing drives were rather called for so as to counteract the negative perceptions the world had about the quality of calcium carbide from China.

### **5.6.6 New product and manufacturing process innovation**

Of the total participants, 40% considered new product innovation as important in enhancing profitability, 20% considered it as very important, and a combined 40% did not see it as a necessity. The proponents for the importance of new product innovation explained that changes in blend design for the calcium carbide used in the desulphurisation of steel according to individual customer needs was very important and would drive profitability. They also felt the portfolio differentiation would offer them a competitive edge.

For those that deemed it as unnecessary, their argument was that the customers were already using equipment and manufacturing processes suited to a particular product, and any changes would be counterproductive. For manufacturing process innovation, 30% considered it as 'very important' and 30% considered it as 'important'. They gave an example of companies that failed to move to closed type arc furnaces for calcium carbide manufacture that were shut down by the Chinese government, as their operations were harmful to the environment. The other 40% of the respondents did not recognise the need for innovation of a manufacturing process, arguing that the costs for research and development were prohibitive and would drive up the price of calcium carbide in the market, thereby losing the edge they had over competitors.

### **5.6.7 Manufacturing footprint and raw material sourcing strategies**

The overwhelming response for the interview participants was that it was important to have sound raw material sourcing strategies as well as a good manufacturing footprint in order to enhance profitability of companies. They explained that making the right product at the right places was very critical, as it would speed up delivery of product to targeted markets. This is exemplified by erection of ball mills in other targeted countries so as to further refine the calcium carbide. From the study 60% considered this factor as very important, 20% deemed it important and only a combined 20% of the respondents did not see the importance of the factor as a strategy for driving profitability.

## **5.7 Narrative text on rest of interview responses discussion**

### **5.7.1 Interview question 4**

What international safety, health, environmental and quality systems do you follow and are you certified by any? The question was designed to elicit responses that would gauge the source of the low cost competitive advantage of the Chinese manufacturers as per **Objective 4** of the study.

#### **Responses**

All the respondents interviewed said they were holders of a permit for the Calcium Carbide Industry issued by the National Development and Reform Commission (NDRC). The permit is aimed at promoting the smooth development for the calcium carbide industry and also ascertains that production safety is safeguarded. They also said that the quality of products shipped as exports was good, as prior to shipping inspections were mandatory as gazetted by the State Council. The companies also mentioned that the fact that they were exporters of the product meant that they subscribed to various international standards that have to be met prior to shipping, for example, the marking of the packaging of the drums as hazardous materials.

### **5.7.2 Interview questions 6 and 7 and 8**

What would you say makes it worthwhile to target the export market, and what is your value proposition? What policies were put in place by the Chinese government for export promotion? These questions were also inclined towards realisation of Objective 4 of the study.

#### **Responses**

All the respondents mentioned the overcapacity in China and the chase for elusive foreign currency as driving forces behind the need to export calcium carbide. They all also mentioned favourable government policies playing a role in enhancing their competitiveness in the global market such as tax concessions, being allowed to retain earned foreign currency, export subsidies and duty exemptions for main raw materials imported to make calcium carbide intended for the export market.

## 5.8 Price trends for export calcium carbide [Chinese product]

These findings were consistent with the need to achieve the aim of **Objective 2** which sought to establish what the current prices of calcium carbide were as offered by the Chinese firms.

**TABLE 5.1 HISTORICAL TRENDS FOR CHINESE MANUFACTURED CALCIUM CARBIDE AVERAGE PRICES**

Year	Average Ex-factory Prices (no Freight)	
	RMB/t	US\$/t
2010	3725	586
2011	3750	580
2012	3400	539
2013	2900	468
2014	2825	460

Adapted from China Chemical Reporter (2014). *China Chemical Reporter*. [Online]

Available at:

<http://web.b.ebscohost.com.ezproxy.ukzn.ac.za:2048/ehost/pdfviewer/pdfviewer?vid=9&sid=128bbfdd-43b1-4aa5-877f-92ddc4c30222%40sessionmgr198&hid=115>

[Accessed 28 June 2015].

**Comments:** It is evident from the table 5.1 above that the Chinese prices have been going down every year. This is putting pressure on companies like SA Calcium Carbide to also drop their prices, as they run the risk of losing market share.

## 5.9 S.A Calcium Carbide average price trends for exports

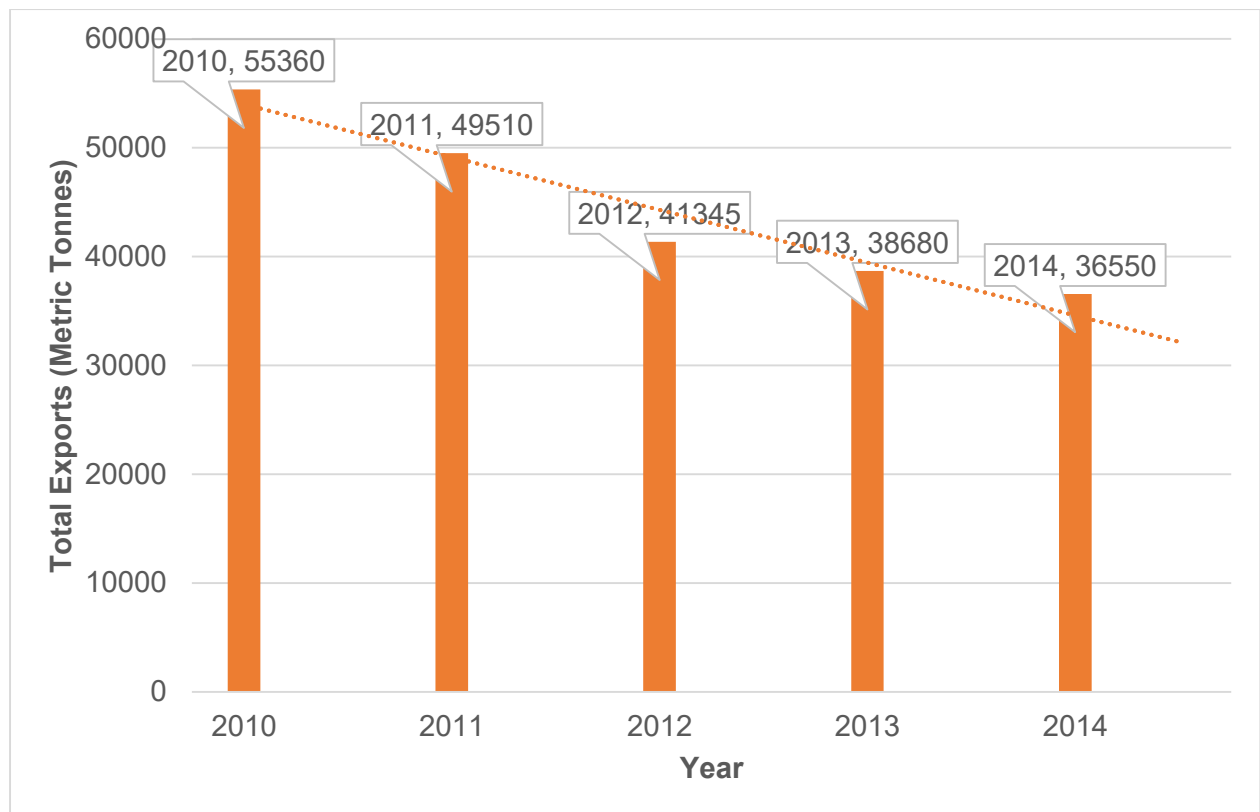
**TABLE 5.2 AVERAGE EXPORT PRICE HISTORY FOR CALCIUM CARBIDE FROM SOUTH AFRICA**

Year	Average Ex-factory Prices (no Freight)
	US\$/t
2010	1100
2011	950
2012	915
2013	890
2014	882

Adapted from Kwakernaak, P., 2015. *Commercial Manager S.A Calcium Carbide (Pty) Ltd* [Interview] (16 January 2015).

**Comments:** It is evident from the table 5.2 above that the SA Calcium Carbide prices have been dropping every year because of sustained pressure from the Chinese products. This is despite the fact that the company does not enjoy the same benefits from the government as is the case with Chinese firms. It should be noted however that the prices from South Africa are still twice the prices from the Chinese for the same product. This is a major threat to SA Calcium Carbide as it cannot continue to lower prices when in fact the major cost drivers such as labour and electricity are going up.

### 5.10 S.A Calcium Carbide total exports trends (Kwakernaak, 2015)



**FIGURE 5.1 SA CALCIUM CARBIDE TOTAL EXPORTS HISTORICAL TRENDS**

Adapted from Kwakernaak, P., 2015. *Commercial Manager S.A Calcium Carbide (Pty) Ltd* [Interview] (16 January 2015).

#### Comments

The Figure 5.1 above shows a gradual decrease in the export volumes of SA Calcium Carbide. This could mean that the other customers are already switching to the Chinese products, and SA Calcium Carbide is losing market share. Drastic measures are called for to turnaround this trend.



### **5.11 Results vs problem statement**

It is perceived by South African calcium carbide producers and traders that the presence on global markets of the same product originating from China has had a profound negative impact on their competitiveness. From the results obtained in the study and the discussion above, the perception by the South African producers and traders is therefore founded and correct. There is sufficient statistical evidence that the presence of Chinese manufactured products in the global market erodes the competitiveness of companies like SA Calcium Carbide.

### **5.12 Summary**

From the sample populations studied, it is clear that current customers, who are predominantly from the African continent, buy product from SA Calcium Carbide (SACC) largely because the company is reputable, although they consider the price of the product as expensive. The customers also feel that SACC gives excellent before and after sales support. Paramount to all the motivating factors is that the calcium carbide from SACC is deemed to be of very high quality. On the other hand however, they feel that the prices offered by China are very good and tempting although the quality is lower than that of SACC's product.

It also emerged from the study that the Chinese manufacturers and traders believe that capabilities such as new product innovation, joint ventures and raw material sourcing strategies are very essential in building competitiveness of companies in the global market. Needless to say, companies like SA Calcium Carbide can adopt such strategies to enhance their profitability and sustainability. The export prices for carbide from SACC were also shown to be twice those of the Chinese manufactured products. It was also evident from the results that the export volumes of SA Calcium Carbide were on a gradual downward trend due to loss of market share.

The next chapter focusses on the recommendations and conclusions drawn from the research.

## CHAPTER 6

### Recommendations and conclusions

#### 6.1 Introduction

This chapter presents the recommendations and conclusions arising from the research study. It ties up the research objectives with the findings herein and thus drawing the research to a close. A discussion of recommendations for further studies in the area is also included. The limitations of the study then precede the concluding summary of the chapter which specifically addresses the research question.

The aim of this research study was to discern the extent to which companies like SA Calcium Carbide have been affected by the presence of products from China on the global market with special focus being put on the competitiveness in terms of pricing of products.

#### 6.2 Conclusions

To draw up meaningful conclusions from the research study, an examination of each of the objectives has to be done and tied up to the findings arising from the study.

**Objective 1:** Find out what motivates current customers to buy from SA Calcium Carbide.

The study covered current customers both from the domestic side and from the export side, regionally and internationally.

From the sample populations studied, it is clear that current customers, who are predominantly from the African continent, buy product from SA Calcium Carbide (SACC) largely because the company has a good reputation, although they consider the price of the product as expensive. The customers also feel that SACC gives excellent before and after sales support.

Paramount to all the motivating factors is that the calcium carbide from SACC is deemed to be of very high quality, therefore giving customers value for their money.

**Objective 2:** Establish what the current prices of calcium carbide are as offered by the Chinese companies on the global market.

Various sources for current prices are readily available including marketing information given to SA Calcium Carbide current customers. African customer visits to establish rapport and gather market intelligence are also planned for this purpose.

It can be concluded from the research findings that the Chinese prices for calcium carbide were way below those offered by SA Calcium Carbide. The widely held supposition is that the low price of the Chinese product stems from the fact that the quality of the product is inferior to that of the SA Calcium Carbide. However, exporters still need to adhere to pre-quality checks before shipping the products and are also affiliated to quality international bodies. This negates the fact that the prices are low because the quality is low, but rather because there are other sources of competitiveness.

**Objective 3:** Establish how big the threat is posed by the Chinese products to a company such as SA Calcium Carbide (SACC).

This was achieved through assessment of its current customers' opinions with regard to Chinese product quality, lead times to delivery, sales support and pricing of product.

For this objective to be realised, a study of the perceptions of the current SA Calcium Carbide with regard to pricing and quality of Chinese product was done. It revealed that 78% of the respondents believe that the price offered by the Chinese is good, which translates to cheap. This is of particular concern to SA Calcium Carbide, as this kind of response was coming from its own customers. Only a fifth of the total respondents thought the way the Chinese were pricing their product was bad, probably because it sent the wrong signals regarding the quality of the product to be expected.

In terms of product quality itself, the major threat posed to SACC though is that more than 36% of the respondents considered the Chinese product as good, with 8% of them actually choosing the 'very good' option.

This means then that the Chinese firms, from the perspective of existing SACC customers, offer the following value proposition, low priced calcium carbide of good quality and also with the technical teams ready to render technical support during application of product.

**Objective 4:** Investigate what is sustaining the Chinese producers' value proposition at present.

This was achieved through an analysis of their production processes and models, study of Chinese regulations, current average wages in China, safety records of Chinese companies, quality endorsements certificates for Chinese producers etc. For this the first prize is a visit to China. Telephonic interviews also planned.

The study revealed that low labour costs that characterise the Chinese calcium carbide industry play an integral part in allowing them to be low cost producers. The export promoting policies currently in place set out by the Chinese government also make it worthwhile for producers of calcium carbide to target the global market beyond its borders. These favourable government policies enhance their competitiveness in the global market. These include tax concessions, being allowed to retain earned foreign currency, export subsidies and being granted duty exemptions for main raw materials imported to make calcium carbide intended for the export market.

### **6.3 Recommendations to SA Calcium Carbide**

**Objective 5:** Draw up a list of recommendations on what strategies companies such as SA Calcium Carbide can employ to remain competitive and retain existing market share whilst still operating profitably and in a sustainable manner.

- ❖ It is recommended that the company invests in research and development to allow new product and manufacturing process innovation.

The changes in the composition of the blends of the calcium carbide would be a differentiating factor and would be specific to already existent customers, thereby building a barrier to entry by substitute products.

Manufacturing process innovation would also help lower manufacturing costs and improve efficiencies.

- ❖ Engagement with the government bodies, especially the Department of Trade and Industry, to advocate for implementation of import tariffs for calcium carbide to help protect the domestic market.
- ❖ Adoption of aggressive marketing techniques and before and after sales support to retain market share especially in Africa.
- ❖ More than 40% of SA Calcium Carbide's cost drivers are apportioned to power consumption by the closed arc furnace. Efforts should be redoubled to maximise the efficiency of the newly commissioned power generating engines and thus be self-sustainable.
- ❖ Supply chain innovation methods such as adopting vertical integration techniques especially regarding the main raw materials for the calcium carbide manufacture process are critical. It is against that backdrop that the company must continue pursuing other cheap sources of lime and anthracite especially in the Middle East.
- ❖ It is obvious that the company cannot match the Chinese prices in the market and as such should initiate fixed cost cutting measures and employ good cash flow management techniques so as to be able to be in a position to give customers favourable payment terms and thus retain their business.
- ❖ The Sales and Marketing team should make use of the export guide (Trade and Investment KwaZulu-Natal, 2012) that has all the guidelines of how to sustain a business and be competitive as a net exporter.

#### **6.4 Recommendations for further studies**

- ❖ The current study focussed on how SA Calcium Carbide is being affected by the presence of Chinese manufactured products in the global market, and conclusions such as loss of market share were drawn from that. The global market also has calcium carbide from other manufacturers such as Europe, with Slovenia being a major player, and as such the effects felt by SACC are not necessarily perpetrated by the Chinese only. Future studies should thus factor in this variable.
- ❖ The respondents used in this study were mainly procurement personnel for the companies concerned. Future studies should cover responses from several people working for the same company to enhance validity of the findings and not having to rely on one person's opinions. This would entail visits to the targeted companies and spending time with different representatives.
- ❖ Budget allowing, making use of several interpreters for different languages in different countries would help the respondents to easily comprehend the questions directed at them and thus respond accordingly and as accurately as possible rather than getting lost in translation sometimes.

#### **6.5 Limitations of the study**

One of the limitations to this study was that convenience sampling, a non-probability design, was used so as to be able to collect data in a relatively short period of time with the least amount of difficulty. The data was collected from already existing SA Calcium Carbide (Pty) Ltd customers and therefore were conveniently available to provide the research data. The downside of this method is that there are other users of calcium carbide in the global market that are not SA Calcium Carbide customers. They could have provided insightful feedback as they are also integral to the industry. It should be noted nevertheless that the findings of this study should be fairly reflective of the population in the area of interest, as SA Calcium Carbide commands a commendable global market footprint.

## **6.6 Summary**

The study herein fully addressed and realised the objectives set out prior to commencement of the research work. The literature review revealed that indeed the presence of Chinese manufactured goods in global markets has a negative consequence on the competitiveness of other similar products in the industry such as those from SA Calcium Carbide. Recommendations were also given, arising from the research findings, on possible strategies companies like SA Calcium Carbide could use, which are bearing the brunt of the Chinese global trading muscle to sustain their businesses. Areas that would need further research were highlighted and the limitations that characterised this particular study were stated.

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## APPENDICES

## **APPENDIX 1A: Respondent Informed Consent Form**



Dear Respondent,

**MBA Research Project**

**Researcher:** Royce Sitshonile Mazo (0027 78 019 1387)

Email Address: [roycem@sacarbide.com](mailto:roycem@sacarbide.com)

**Supervisor:** Dr. Elias Munapo (0027 31 260 8943)

Email Address: [munapoe@ukzn.ac.za](mailto:munapoe@ukzn.ac.za)

**Research Office:** Ms Mariette Snyman (0027 31 260 8350)

Email Address: [Snymanm@ukzn.ac.za](mailto:Snymanm@ukzn.ac.za)

I, Royce Sitshonile Mazo, (Student Number: 213570661), an MBA student at the Graduate School of Business and Leadership, of the University of KwaZulu-Natal, and also working as Technical Sales Manager for SA Calcium Carbide (Pty) Ltd, kindly invite you to participate in a research project entitled:

*“The impact of the presence on global markets of Calcium Carbide originating from China on other industry role players: The case of SA Calcium Carbide (Pty) Ltd”.*

**The Purpose of the Study:** The idea is to discern the extent to which companies like SA Calcium Carbide (Pty) Ltd have been affected by the presence of similar products from China with special focus being put on prices and what such companies can do to remain competitive. This would be achieved by:

- 1) Finding out what motivates current customers to buy from SA Calcium Carbide (Pty) Ltd.
- 2) Establishing what the current prices of calcium carbide are as offered by the Chinese companies on the market.
- 3) Carrying out an in-depth study of the Chinese producers' value proposition. This would be achieved through analysis of their production processes, current average wages for employees, safety statistics and SHERQ certifications.
- 4) Identify if certain markets have lower barriers to Chinese goods entry than others and what those are.
- 5) Determining how SA Calcium Carbide (Pty) Ltd can remain competitive and still retain or grow existing market share.

Through your participation I hope to answer the critical questions raised above. This research would therefore assist in establishing recommendations to allow SA Calcium Carbide (Pty) Ltd to understand better the needs of the customers and thus thrive to remain the preferred supplier of calcium carbide. It would also go a long way in helping SA Calcium Carbide (Pty) Ltd fully comprehend the export price trends and thus be able to predict future patterns with a view of remaining a sustainable entity despite threats of new entrants.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequences. There would be no monetary gain emanating from participating in this research. Confidentiality and anonymity of records identifying you as a participant will be maintained by the Graduate School of Business and Leadership, University of KwaZulu-Natal.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me or my supervisor, the details of which are listed above.

The survey should take about 10 – 15 minutes to complete. I hope you will take some of your precious time to complete.

Sincerely

Student/Researcher Signature: .....

Date: .....

***This page is to be retained by the participant.***

## **APPENDIX 1B: Sample Respondent Consent Letter**



Dear Respondent,

**MBA Research Project**

**Researcher:** Royce Sitshonile Mazo (0027 78 019 1387)

Email Address: [roycem@sacarbide.com](mailto:roycem@sacarbide.com)

**Supervisor:** Dr. Elias Munapo (0027 31 260 8943)

Email Address: [munapoe@ukzn.ac.za](mailto:munapoe@ukzn.ac.za)

**Research Office:** Ms Mariette Snyman (0027 31 260 8350)

Email Address: [Snymanm@ukzn.ac.za](mailto:Snymanm@ukzn.ac.za)

Research Project Title:

*"The impact of the presence on global markets of Calcium Carbide originating from China on other industry role players: The case of SA Calcium Carbide (Pty) Ltd".*

**CONSENT**

I ..... (Full names of participant)

Working for ..... (Full company name)

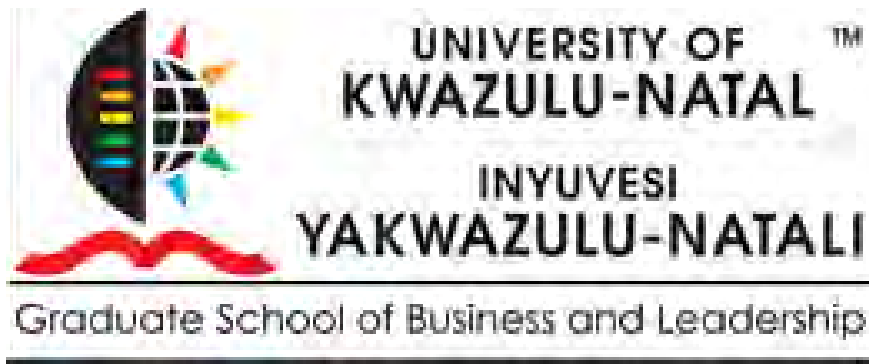
Hereby confirm that I fully understand the contents of this document and the nature of the research project and I consent fully to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT: .....

DATE : .....

## **APPENDIX 2: Questionnaire for SA Calcium Carbide Customers**



### **MBA Research Project**

**Researcher:** Royce Sitshonile Mazo (0027 78 019 1387)

Email Address: [roycem@sacarbide.com](mailto:roycem@sacarbide.com)

**Supervisor:** Dr. Elias Munapo (0027 31 260 8943)

Email Address: [munapoe@ukzn.ac.za](mailto:munapoe@ukzn.ac.za)

**Research Office:** Ms Mariette Snyman (0027 31 260 8350)

Email Address: [Snymanm@ukzn.ac.za](mailto:Snymanm@ukzn.ac.za)

*“The impact of the presence on global markets of Calcium Carbide originating from China on other industry role players: The case of SA Calcium Carbide (Pty) Ltd”.*

### **QUESTIONNAIRE FOR CURRENT SA CALCIUM CARBIDE (PTY) LTD CUSTOMERS**

#### **INTRODUCTION**

This questionnaire is designed to gather information pertinent to how Chinese calcium carbide producers AND suppliers have impacted the world industry as a whole through their pricing of the product with special emphasis being put on current SA Calcium Carbide (Pty) Ltd customers. Please feel very free to express your views and suggestions and answer the questions to the best of your ability. Also note that your responses would be treated with the strictest of confidences. This would take about 10 minutes of your time at most.

**CONTROL INFORMATION [PLEASE FILL IN YOUR DETAILS BELOW]**

NAME: .....

ORGANIZATION: .....

COUNTRY: .....

**GENERAL INFORMATION ABOUT THE SECTOR/ COMPANY [TICK WHERE APPLICABLE]**

1) What best describes your business in relation to the Calcium Carbide industry?

DIRECT CONSUMER	
TRADER	
BOTH	

2) What volumes of calcium carbide do you handle per year in metric tonnes?

LESS THAN 100	
100 TO LESS THAN 500	
500 TO LESS THAN 1000	
1000 TO LESS THAN 10000	
GREATER THAN 10000	

3) How long have you been in the business of calcium carbide?

LESS THAN 5 YEARS	
5 YEARS TO < 10 YEARS	
10 YEARS TO < 20 YEARS	
MORE THAN 20 YEARS	

4) What is your intended use of calcium carbide after procurement?

SUPPLY IT TO DIRECT CONSUMERS	
ACETYLENE GENERATION	
STEEL MAKING RAW MATERIAL	
OTHER	

If answer above is "Other" please specify below:


#### ASSESSMENT QUESTIONS [TICK WHERE APLICABLE]

1) Which of the following factors had the greatest impact on the observed buying patterns of products from SA Calcium Carbide (Pty) Ltd? Tick where applicable.

Reason	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Very good product quality					
Timeous delivery of product to preferred destination					
Excellent before and after sales support					
Very affordable product					
Good reputation of SA Calcium Carbide (Pty) Ltd					
Other Reasons					

If **Other Reasons** explain in short: .....

2) What is your opinion in terms of the calcium carbide originating from China under the following factors?  
Place a tick under the number that best describes your opinion according to the scale below where 5 indicates very good quality and 1 is a score for very bad quality:

Very Good   5   4   3   2   1   Very Bad

Rating		5	4	3	2	1
Chinese Products and Services	Product quality					
	Timeliness of delivery of products					
	Support before and after sales					
	Pricing of product (CIF)					

Any other comments with regards to the products originating from China in short?  
.....

END OF QUESTIONNAIRE [THANK YOU FOR YOUR PARTICIPATION]



### **APPENDIX 3: Interview Questions for Manufacturers & Traders of Calcium Carbide from China**

**MBA Research Project**

**Researcher:** Royce Sitshonile Mazo (0027 78 019 1387)

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**Supervisor:** Dr. Elias Munapo (0027 31 260 8943)

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*“The impact of the presence on global markets of Calcium Carbide originating from China on other industry role players: The case of SA Calcium Carbide (Pty) Ltd”.*

**INTERVIEW QUESTIONS FOR CHINESE CALCIUM CARBIDE SUPPLIERS AND TRADERS**

**INTRODUCTION**

This interview is designed to evaluate what the Chinese calcium carbide suppliers' current value proposition is to the global market. Please feel very free to express your views and suggestions and answer the questions to the best of your ability. Also note that your responses would be treated with the strictest of confidences. This would take about 10 minutes of your time at most.

**CONTROL INFORMATION [PLEASE FILL IN YOUR DETAILS BELOW]**

NAME: .....

ORGANIZATION: .....

COUNTRY: .....

## **INTERVIEW QUESTIONS**

- 1) Are you a producer or a trader of calcium carbide?
- 2) What volumes of calcium carbide in metric tonnes do you handle per year
- 3) How long have you been involved in the business of calcium carbide?
- 4) What international Safety, Health, Environment and Quality systems do you follow and are you certified by any? If so which ones?
- 5) If you are a producer, where do you source your main raw materials for your processes?
- 6) What would you say makes it worthwhile to target the global export market?
- 7) What would you say is your value proposition to the global export market?
- 8) In your own opinion what are the policies or regulations put in place by the Chinese government that encourage the export business?

9) Where do you have most of your global market footprint? What could be the explanation?

10) Do you think developing home grown innovation and technology capabilities is fundamental in increasing competitiveness of companies? Please explain.

11) Based on your knowledge of the Chinese and international calcium carbide industry, how do you rate each of the following capabilities in driving the profitability of the companies in the sector?

	<i>Very Important</i>	<i>Important</i>	<i>Not Important</i>	<i>Not Very Important</i>
Manufacturing footprint and raw material sourcing strategies				
Manufacturing process innovation				
New product innovation				
Improved product quality				
Raw material flexibility				
Keeping labour costs as minimal as is possible				
New and enhanced customer services				
Supply chain innovation and collaboration				
Joint ventures to acquire access to new markets, technology or talent				
Other (Specify)				

**END OF INTERVIEW QUESTIONS**  
**THANK YOU FOR YOUR PARTICIPATION**

## **APPENDIX 4: Ethical Clearance Certificate**

23 March 2015

Mr Royce Sitshonile Mazo (213570661)  
Graduate School of Business and Leadership  
Westville Campus

Dear Mr Mazo,

Protocol reference number: HSS/0187/015M

Project title: The impact of the presence on global markets of Calcium Carbide originating from China on other industry role players: The case of SA Calcium Carbide (Pty) Ltd

**Full Approval – Expedited Approval**

With regards to your application received on 18 March 2015. The documents submitted have been accepted by the Humanities & Social Sciences Research Ethics Committee and **FULL APPROVAL** for the protocol has been granted.

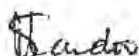
Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

Please note: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully



Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr Elias Munapo  
Cc Academic Leader Research: Mr M Hoque  
Cc School Administrator: Ms Zarina Bullyraj / Ms Gina Mshengu

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Humanities & Social Sciences Research Ethics Committee

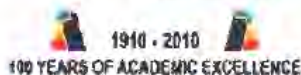
Dr Shenuka Singh (Chair)






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Website: [www.ukzn.ac.za](http://www.ukzn.ac.za)



Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

